

**Purchasing Services Bureau
Montana Department of Transportation
2701 Prospect Avenue
P.O. Box 201001
Helena, MT 59601**

Re: Impact of Canadian Economic Development on Northern Montana Highways

Dear Members of the Selection Committee,

HDR is pleased to submit this proposal to Montana Department of Transportation to perform the consulting services for the Study of Impact of Canadian Economic Development on Northern Montana Highways. The HDR team understands the importance of this study and the comprehensiveness and the due-diligence required in this study to achieve an accurate assessment and forecast for future infrastructure needs due to the Canadian economic development.

HDR's reputation for providing objective and independent decision support services is second to none. Indeed, we believe that objectivity, process transparency, and independence are key to the success of this study and providing Montana Department of Transportation with reliable assessment of future economic conditions and the infrastructure needs both for roadways and port operations.

Our group has developed more economic studies related to border and impact on infrastructure needs for federal, state and local agencies that any other firms in the US and Canada. HDR is therefore uniquely positioned to help MDOT achieve this important mandate:

- HDR has an exceptional team of transportation economists with specialization in economic impact, cost-benefit analysis, and feasibility studies of infrastructure projects. In fact, Dr. Khalid Bekka, our proposed Principle-in Charge, and Mr. Dan Hodge, our proposed Project Manager, have conducted dozens similar studies throughout the county. They have also published numerous research articles on the subject and are best positioned to ensure that the analysis framework is sound and rooted in state of the art economic principles;
- HDR has assessed the feasibility and the economic impact of new crossing to alleviate congestion at the border between Southern California and Mexico.
- HDR has conducted a national study for the Department of Commerce to assess the infrastructure needs at the southern border with Mexico to reduce congestion and its impact on trade.
- HDR has successfully conducted economic impact studies of border delay for both personal trips and freight movements for San Diego Association of Governments and another for Imperial Valley Association of Governments. The findings were presented to different levels of government including the Border Legislators Conference.
- HDR has been retained by the Federal Highway Administration, Michigan Department of Transportation, Transport Canada, and Ontario Department of Transportation to estimate the economic impacts both for tourism and recreation trips as well as freight traffic due to increasing delays at the Canadian-American crossings after the September 11 events.

- HDR has been retained for a ten-year contract by the Department of Homeland Security to estimate the economic and financial impacts of various planned processing technologies at over 250 POEs between the US and Mexico, and the US and Canada.
- HDR has been retained by TXDOT to assess the economic feasibility of a new border crossing for La Entrada Corridor in Western Texas.
- HDR has been retained by Maine DOT, in conjunction with New Hampshire, Vermont and the provinces of Nova Scotia,, New Brunswick, Quebec, and Ontario to assess the economic feasibility of a CANAM corridor linking Northeast United States to Southeast Canada.

To ensure sound decisions, it is essential that the impact analysis be based on a well- established economic framework and process that is proven, credible, transparent, accessible, and auditable. Furthermore, it is important that the outcomes of the analysis be understood accessible by economists, policy makers, planners and the public alike. Our proposed approach to assessing the Impact of Canadian Economic Development on Northern Montana Highways, therefore, is at once scientific, objective, publicly accessible and fully transparent.

To summarize, the HDR Team brings the technical economic knowledge, transportation infrastructure experience, and the institutional dynamics to meet Montana Department of Transportation needs. This proposal will demonstrate how HDR is uniquely-positioned to ensure MDT is successful in this important mandate.

Thank you for giving us this opportunity to describe our qualifications and approach. We welcome the opportunity to serve Montana Department of Transportation and to demonstrate that HDR truly is one company with many solutions. If you find, while reviewing this statement of qualifications, that you have any questions or concerns, please feel free to contact us at 240-485-2605.

Sincerely,

A handwritten signature in black ink, appearing to read 'Khalid Bekka', written in a cursive style.

Khalid Bekka, Ph.D.
Principal In Charge / Vice President
240.485.2605



STATE OF MONTANA REQUEST FOR PROPOSAL (THIS IS NOT AN ORDER)

RFP Number: HWY- 308811-RP	RFP Title: Impact of Canadian Economic Development on Northern Montana Highways
RFP Due Date and Time: August 19, 2008 3:00 pm, Local Time	Number of Pages: 40 Number of Attachments: 0

ISSUING AGENCY INFORMATION

Procurement Officer: Richele Parkhurst	Issue Date: June 30, 2008
Purchasing Services Bureau Montana Department of Transportation P.O. Box 201001 Helena, MT 59620-1001	Phone: (406) 444-7226 Fax: (406) 444-7613 TTY Users: 1-800-335-7592 or (406) 444-7696 Website: http://vendor.mt.gov/

INSTRUCTIONS TO OFFERORS

Return Sealed Proposal to: Purchasing Services Bureau Montana Department of Transportation 2701 Prospect Avenue P.O. Box 201001 Helena, MT 59601	Mark Face of Envelope/Package: RFP Number: HWY-308811-RP RFP Response Due Date: August 19, 2008 MDT attempts to provide accommodations for any known disability that may interfere with a person participating in any service, program or activity of the Department. Alternative accessible formats of this information will be provided upon request. For further information call Richele Parkhurst at (406) 657-0274 Voice or 1-800-335-7592 TTY or TTY (406) 444-7696.
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IMPORTANT: SEE STANDARD TERMS AND CONDITIONS

OFFERORS MUST COMPLETE THE FOLLOWING

Offeror Name/Address: HDR Engineering, Inc. 2913 Millennium Circle & 8403 Colesville Road Billings, MT 59102 Silver Spring, MD 20910	Authorized Offeror Signatory: Khalid Bekka  (Please print name and sign in ink)
Offeror Phone Number: 406.656.8100 & 240.485.2600	Offeror FAX Number: 406.652.2758 & 240.485.2635
Offeror Federal I.D. Number: 47-0680568	Offeror E-mail Address: khalid.bekka@hdrinc.com

OFFERORS MUST RETURN THIS COVER SHEET WITH RFP RESPONSE

July 28, 2008

ADDENDUM #1 TO
MONTANA DEPARTMENT OF TRANSPORTATION
REQUEST FOR PROPOSAL
#HWY-308811-RP

Listed below are the written questions received in regards to Request for Proposal #HWY-308811-RP. All questions are "verbatim" as presented to the Department.

1. General

Section 3.2 Tasks. We read the tasks as a mix of transportation/traffic planning and engineering (e.g., 3.2.2), and economic analysis (3.2.3). Does MDT have an opinion about whether the prime contractor for this project should come from the side of traffic engineering or from transportation/regional economics?

Response: The MDT will leave the choice of the Prime to the discretion of the proposer and to their interpretation with the needs of the project.

Section 4.1.3 Last sentence says "*Offeror must specifically address each of the following requirements as defined in this RFP*". I can find no following requirements. Please clarify.

Response: The sentence should read:
Offeror must specifically address each of the requirements as defined in this RFP.

2. Cost

Section 5.2 says there is no set budget; section 5 asks for budget amount and breakdown. Section 6 does not list cost as a criterion or as part of the 300 points. It does say "*The Cost Proposal will be evaluated based on the formula set forth below*", but I cannot find what formula it might be referencing. How will cost be evaluated?

Response: Please disregard the statement '*The Cost Proposal will be evaluated based on the formula set forth below*'. The cost statement is a sealed item and not part of the evaluation criteria.

Section 3.3 says "*...interim meetings may be necessary*" and that "*...interim reports may be necessary*." Since the number of those meetings is not specified, how would MDT like us to construct the budget to show those potential meetings and interim reports?

Response: Based on your (estimated) frequency of additional reports or meetings above (based on the contractors understanding of the intent of the effort) and beyond what is currently required in the RFP, the prospective candidate is to add those items as a line item cost to the project to be deducted from the project budget if those items do not take place.

Though there is no set budget, would MDT be willing to stipulate a range to give contractors an idea about expected level of effort?

Response: No. Please refer to section 5.2 of the RFP.

3. Appendix B, Contract

Section 1.5.1 discusses the acceptance of the standard terms and conditions/contract. It states in section 1.5.1 that "*...requests for additions or exceptions to the standard terms and conditions, contract terms, including any necessary licenses, or any added provisions must be submitted to the procurement officer by the date for receipt of written/e-mailed questions and must be accompanied by an explanation of why the exception is being sought.*" As such, we respectfully request consideration of the following contract modifications:

Contract Section 3.2 Ownership: *All data, summaries, charts, records, materials, manuals, etc collected, developed, and prepared as a result of this contract shall be the property of the DEPARTMENT for its exclusive use. The DEPARTMENT may duplicate and alter the materials without consent from the CONTRACTOR.*

Requested Modification: We would ask to add the following provision to section 3.2:

Such documents are not intended or represented to be suitable for reuse by the DEPARTMENT or others on any other project. Any such reuse without written verification or adaptation by CONTRACTOR, as appropriate, for the specific purpose intended will be at DEPARTMENT's sole risk and without liability or legal exposure to CONTRACTOR, and DEPARTMENT shall indemnify and hold harmless CONTRACTOR from all claims, damages, losses and expenses including attorneys' fees arising out of or resulting therefrom. Any such verification or adaptation will entitle CONTRACTOR to further compensation at rates to be agreed upon by the DEPARTMENT and CONTRACTOR.

Notwithstanding any other provision of this Agreement between CONTRACTOR and DEPARTMENT or any provision of the scope of work, work assignments, work authorizations, or any amendment issued hereunder, all of CONTRACTOR's pre-existing or proprietary information, documents, materials, computer programs, or software developed by CONTRACTOR outside of this Agreement shall remain the exclusive property of CONTRACTOR.

Rationale for Requested Modification:

In many other contracts, we have worked with the public-sector client to negotiate language that gives the client joint ownership or non-exclusive rights to the products. We understand the reasoning that a client paying for the work should have rights to use it. We typically, however, are allowed to retain the right to use it ourselves, subject of course to issues of confidentiality. But once the report is in the public domain, anyone can use it.

The contracts section 14, Intellectual Property, is consistent with that point and seems to accept the idea of a non-exclusive right.

Response: No.

4. Contract Section 8.2 Primary Insurance: *The Contractor's insurance coverage shall be primary insurance as respect to the State, its officers, officials, employees, and volunteers and shall apply separately to each project or location. Any insurance or self-insurance maintained by the State, its officers, officials, employees or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.*

Requested Modification: We would ask to add the following language at the end of the first sentence: "...or the policy aggregate shall be twice the individual amounts noted below."

Rationale for Requested Modification:

The language "...and shall apply separately to each project or location" can be interpreted as a "per project aggregate", which is not available on all policies as required here.

Response: No.

5. Contract Section 8.7 Specific Requirements for Professional Liability: *The Contractor shall purchase and maintain occurrence coverage with combined single limits for each wrongful act of \$500,000 per occurrence and \$1,000,000 aggregate per year to cover such claims as may be caused by any act, omission, negligence of the Contractor or its officers, agents, representatives, assigns or subcontractors. Note: if "occurrence" coverage is unavailable or cost prohibitive, the Contractor may provide "claims made" coverage provided the following conditions are met: (1) the commencement date of the contract must not fall outside the effective date of insurance coverage and it will be the retroactive date for insurance coverage in future years; and (2) the claims made policy must have a three year tail for claims that are made (filed) after the cancellation or expiration date of the policy.*


Requested Modification: We would ask to add the following sentence at the end of the paragraph: "Alternately, the Contractor may provide "claims made" coverage provided that he maintains Professional Liability coverage for a period of three years after the conclusion of the contract."

Rationale for Requested Modification:

As presently written, Section 8.7 would require the procurement of an extended reporting period (commonly called tail coverage) at additional, and arguably unnecessary, cost. Most professional firms, ours included, maintain professional liability insurance coverage on an ongoing basis that would provide coverage for this project after the completion of the project. Therefore procuring the tail coverage is an unnecessary expense.

Response: No.

I, HDR Engineering, Inc. have received the following addendum:
(Company Name)

Addendum #1 
(Signature)

A copy of this signed addendum **MUST** be included with your bid response. Failure to include a copy of this addendum with your response will result in disqualification of your response.

MDT attempts to provide accommodations for any known disability that may interfere with a person participating in any service, program or activity of the Department. Alternative accessible formats of this information will be provided upon request. For further information call Richele Parkhurst at (406) 657-0274 Voice or 1-800-335-7592 TTY or TTY (406) 444-7696.

COVER LETTER

MDT COVER PAGE

MDT ADDENDUM #1

1. PROJECT OVERVIEW AND INSTRUCTIONS	2
2. RFP STANDARD INFORMATION	3
3. SCOPE OF PROJECT	4
4. OFFEROR QUALIFICATIONS	27
5. COST PROPOSAL	58
6. EVALUATION CRITERIA	59
APPENDIX A: STANDARD TERMS AND CONDITIONS	60
APPENDIX B: CONTRACT	61
APPENDIX C: THE RISK ANALYSIS PROCESS	62

1. PROJECT OVERVIEW AND INSTRUCTIONS

1.0. Project Overview

1.1. Contract Term

HDR understands and will comply.

1.2. Single Point of Contact

HDR understands and will comply.

1.3. Definition of Terms

HDR understands and will comply.

1.4. Required Review

HDR understands and will comply.

1.5. General Requirements

HDR understands and will comply.

1.6. Submitting a Proposal

HDR understands and will comply.

1.7. Cost of Preparing a Proposal

HDR understands and will comply.

2. RFP STANDARD INFORMATION

2.0. Authority

2.1. Offeror Competition

HDR understands and will comply.

2.2. Receipt of Proposals and Public Inspection

This proposal does not contain confidential materials.

HDR understands and will comply.

2.3. Classification and Evaluation of Proposals

HDR understands and will comply.

2.4. State's Rights Reserved

HDR understands and will comply.

3. SCOPE OF PROJECT

3.0. Background

PROJECT UNDERSTANDING AND RESEARCH OBJECTIVES

With the significant growth that Western Canadian provinces have been experiencing, especially in energy-related sectors, there could be a significant impact of freight movement on Montana's infrastructure that provides vital linkage between the Provinces of Alberta and Saskatchewan and the rest of the United States. This study aims at identifying potential future infrastructure needs, by assessing current and future conditions about Canadian's economic growth as well as service level scenarios for the nine ports within the State of Montana.

The study will, therefore, estimate the demand and its impact on existing point of entries and whether the growth is sustainable and would require improvements to existing infrastructure capacity, especially the North-South highway corridors. The overall study as MDT has planned will consist of two phases:

Phase I: Assessment of current and future economic conditions and related commercial vehicle traffic growth with and without expansion

Phase II: Impact on highways and necessary improvements

The success of the study hinges on some key factors, including:

- Fully recognizing the ultimate goal, even if this part of the study only focuses on Phase I.
- A comprehensive assessment of existing infrastructure (roadways and port of entries) conditions;
- An accurate forecast of economic growth in Canada, trade levels, freight traffic, and economic development;
- Taking into consideration inputs from various stakeholders and agencies that is possibly impacted;
- Providing continuous updates to the MDT and soliciting inputs and comments on deliverables; and
- Thorough reporting of the findings using text and graphics at both the executive/summary level, and the more technical/detailed level.

HDR is arguably one of the most respected and widely employed firms in conducting economic impact analysis due to policy and/or economic changes, that meet all the success factors to achieve the goals described above. HLB also has strong credentials in conducting similar important studies:

- HDR has assessed the feasibility and the economic impact of new crossing to alleviate congestion at the border between Southern California and Mexico.
- HDR has conducted a national study for the Department of Commerce to assess the infrastructure needs at the southern border with Mexico to reduce congestion and its impact on trade.

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

- HDR has successfully conducted economic impact studies of border delay for both personal trips and freight movements for San Diego Association of Governments and another for Imperial Valley Association of Governments. The findings were presented to different levels of government including the Border Legislators Conference.
- HDR has been retained by the Federal Highway Administration, Michigan Department of Transportation, Transport Canada, and Ontario Department of Transportation to estimate the economic impacts both for tourism and recreation trips as well as freight traffic due to increasing delays at the Canadian-American crossings after the September 11 events.
- HDR has been retained for a ten-year contract by the Department of Homeland Security to estimate the economic and financial impacts of various planned processing technologies at over 250 POEs between the US and Mexico, and the US and Canada.
- HDR has been retained by TXDOT to assess the economic feasibility of a new border crossing for La Entrada Corridor in Western Texas.
- HDR has been retained by Maine DOT, in conjunction with New Hampshire, Vermont and the provinces of Nova Scotia, New Brunswick, Quebec, and Ontario to assess the economic feasibility of a CANAM corridor linking Northeast United States to Southeast Canada.
- HDR has also conducted studies for the National Cooperative Highway Research Program involving major surveys, in collaboration with UC-Irvine, on valuation of travel time-savings and predictability in congested conditions.

The approach proposed below borrows from findings and methodologies developed in the course of these engagements.

3.1. Scope of Work

The primary purpose of this research project is to evaluate current and projected Canadian economic activity and the associated commercial traffic that generates onto Montana highways and US-Canada border crossings (ports). The ports and highways under consideration stretch from the Port of Coumts-Sweet Grass to the Port of Regway-Raymond, and the study will assess the impact on all north-south corridors, which includes Secondary Highways 232, 233, 241, and 511; Montana Highways 24, 13, and 16; US Highways 191 and 2; and Interstate 15. The assessment will forecast unconstrained and constrained commercial traffic through the ports and these corridors. The unconstrained forecast will assume that the capacity and the conditions are not an issue, while the constrained forecast will be based on existing conditions. The assessment will be based on economic conditions that consider multi-state and multi-provincial areas to capture the relevant flows onto the Montana highway system.

This is not a standard cost-benefit analysis, nor an economic impact study per se but, rather, a detailed analysis of existing and future regional economic conditions, based on infrastructure conditions and capacity within the State of Montana, to estimate future commercial traffic volumes through the ports and the corridors listed above. While the ultimate goal is to identify necessary improvements along these corridors, this Phase I establish the research foundation by providing a detailed impact of the Canadian economic development, and the resulting commercial traffic, on Montana highways over the next 20-30 years.

Montana Department of Transportation

Impact of Canadian Economic Development on Northern Montana Highways

The project will comprise tasks and subtasks, described in detail below, in accordance with the Request for Proposal (RFP). We have included a Task 0 for various project administration activities. We have found this task to be very useful for successful tracking of schedule, budget, client communication, and deliverables. The remaining tasks are:

Task 1 – Literature Review

Task 2 – Existing Conditions of Highways and Ports

Task 3 – Existing and Future Economic Conditions and Trends

Task 4 – Future Commercial Traffic Volumes

3.2. Tasks

Task 0 -- Project Administration

0.1 Initiate Project and Set up Project Files

HDR will initiate the project including setting up project files, refining internal budgets and schedules. In order to ensure consistency with MDT requirements, HDR will prepare a “Project Guide” for this project. This document is the basic plan for execution of the project and will include information regarding:

- Client contacts, including names, addresses, phone and fax numbers and e-mail addresses;
- Project team, including names, addresses, phone and fax numbers and e-mail addresses;
- Team member responsibilities;
- Media communications and protocol;
- Scope of Work;
- Budgets by task;
- Schedule;
- Deliverables;
- File Index; and
- Other information necessary to the project team to have a clear understanding of the work and their respective responsibilities.

The Project Guide is an HDR required document for each project. It is an active document, to be updated as necessary throughout the life of the project.

Deliverables

- Project Guide;
- Project Filing System; and
- Updates to the Project Guide as needed.

0.2 Project Meetings

Project meetings with MDT and the project team will be scheduled, coordinated, and documented.

0.2.1 Progress Meetings with MDT

The HDR Project Manager and Principal-In-Charge will attend a project kick-off meeting in Helena with MDT and other research panel members. HDR will be responsible for the agenda and other meeting materials. For example, we plan to prepare a PowerPoint presentation to highlight the research study's goals, work steps, schedule, data needs, and other key issues or challenges.

HDR will also attend a final report meeting in Helena to present the study findings to MDT and interested individuals. We also plan for a workshop together with an interim in-person meeting at a key juncture in the study – most likely after the initial research and preliminary findings have been submitted but before preparation of the full report documents to ensure that the final deliverables have the appropriate content and organization.

HDR is also proposing to gather primary economic data and information from economic development and industry leaders in northern Montana and relevant regions of Canada via in-person and phone interviews (discussed in Task 3). And, to best develop and refine future commercial traffic volume forecasts, we plan to host a risk analysis process (RAP) workshop with key stakeholders and economic/transportation experts (also discussed in more detail in Task 3).

In addition, we anticipate at least monthly progress meetings by conference call between the HDR and MDT project managers. Other team members actively involved in the current phase of the project will be invited to join the call as needed. HDR will prepare and distribute meeting agendas at least 24 hours prior to the meeting/conference call.

The status of the work will be discussed and action items will be identified, along with the person responsible for the action. These meetings will be documented, in writing, by HDR within 10 working days of the meeting.

Deliverables

- Meeting notes and action item list following each scheduled meeting;
- Monthly progress report to MDT Project Manager;
- Agenda and other meeting materials (e.g., PowerPoint slides); and
- Final report presentation to MDT and other stakeholders.

0.2.2 Consultant Project Team Meetings and Communications

These will begin with a Sponsor kickoff meeting to be held soon after receipt of the Notice to Proceed (NTP). HDR will hold team meetings, as appropriate, during which all participants will address their data needs, status of their respective assignments and when they will forward interim and/or final products needed by other team members.

Deliverable

- Internal meeting notes and action item lists following each meeting, and technical documentation in support of milestones, conclusions, or recommendations.

0.3 Progress Reports and Invoicing

Monthly progress reports will be prepared and submitted with each invoice. They will be submitted to the MDT Project Manager along with the project billing invoice for the month. HDR will provide monthly invoices in accordance with MDT standard procedure. Each invoice will include the HDR invoice form showing all labor and direct expenses included for the period, the monthly progress report and documentation of labor hours and direct expenses charged for the period. As project principal, Khalid Bekka will review the progress, budgets, and schedules to ensure the project is meeting MDT's objectives. A summary of each employee's weekly labor totals will be included with the invoices but timesheets will not be required, unless specifically requested by MDT or the Federal Highway Administration for audit purposes.

Assumptions

- The invoice format for this project will be the format currently being used on other HDR projects; and
- Invoicing will be done monthly.

Deliverables

- Monthly progress reports; and
- Monthly invoices.

0.4 Project Schedule and Updates

HDR will provide MDT with a detailed project schedule at the beginning of the project and periodic schedule updates. HDR will clearly show the sequence and interdependence of all activities required for complete performance of all items of work under this scope of work. Activity information shall include activity numbers, descriptions, durations, and scheduled or actual start and finish dates.

HDR will submit two copies of all schedules, one hard copy and one electronic copy, including a written narrative describing any revisions to the schedule. MDT will review and approve updated schedules. Acceptance of any schedule shall not relieve HDR of the responsibilities to adjust labor or work schedules and provide sufficient resources to complete the work within the specified time unless agreed to by MDT. All schedules shall satisfy this Scope of Work (SOW), milestones, and expected completion dates.

Deliverable

- Updated Project Schedule files.

3.2.1. Task 1 – Literature Review

The first task of this research project is to review and summarize relevant literature and regional studies on the regional economies of Alberta and Saskatchewan, and the effects of economic growth on commercial traffic volumes. At the outset of the project, we will develop a draft list of reports and research to review and that share with MDT and the research panel. Based on MDT's guidance, we will adjust and/or add to that list of documents and then produce a concise literature document that covers:

- Similar studies nationwide that have attempted to link economic growth to future traffic volumes, with emphasis on border economies and ports of entry. For example, HDR conducted a study for FHWA and Transport Canada to assess the economic activities on both sides of the border, especially the auto industry, and its impact on border crossing and the roadways to key industrial centers. Similarly, HDR led the economic and trade analysis for the Northeast CanAm Trade and Transportation Study that examined multi-modal transportation investments to facilitate economic growth and a more integrated bi-national economy. Similarly, In addition, HDR recently completed an analysis for Texas DOT that estimated future freight flows at Presidio if the La Entrada al Pacifico highway corridor in Mexico and Texas is completed. That study explicitly accounted for future Mexican economic growth as well as international trade from Asia and South America bound for West Coast ports and US destinations.
- Studies of northern Montana highway and border crossing infrastructure and operations. For example, there have been multiple studies of the US Highway 2 corridor in terms of infrastructure, traffic volumes, and economic conditions. This will include documentation of recent or planned improvements (infrastructure, operations) at ports connecting Montana and Canada. Montana ports of entry (POEs) and their associated north-south Montana roadways to examine include Sweetgrass (I-15) and Wild Horse (232) connecting to Alberta, and Willow Creek (233), Turner (241), Morgan (191), Opheim (24), Scobey (13), Whitetail (511), and Raymond (16) connecting to Saskatchewan.
- Studies of northern Montana economic development conditions. For example, HDR recently led a study of economic conditions, opportunities and highway capacity improvements in northeastern Montana for MDT, and proposed project manager Dan Hodge led the economic evaluation of capacity improvements to the entire US Highway 2 corridor for MDT as part of the Highway Reconfiguration Study. Other regional economic development reports or plans (e.g., Comprehensive Economic Development Strategies [CEDS]) will also be reviewed.

Studies and analyses of recent and projected Canadian economic trends, with emphasis on Alberta and Saskatchewan, such as the Alberta Containerized Intermodal Freight Analysis Study and Saskatchewan Highways and Transportation. HDR economist Fred Kramer (proposed on this project) is located in Calgary and helped develop industry employment forecasts for Calgary and will lead this task in terms of Canadian economic and industry reports.

The resulting literature review will be organized into these categories of research (or similar), and will include a summary of key findings so that this literature review will be a productive source of information and past knowledge for this study, in addition to a reference for other study tasks.

Task 1 Deliverables

- Technical Memorandum #1: Literature Review

3.2.2. Task 2 – Existing Conditions of Highways and Ports

Task 2 covers existing conditions for the highways and ports of entry in northern Montana, along with federal issues and policy for port services and infrastructure. Geoff Parkins from our Billings, Montana HDR office will lead this task based on his knowledge of Montana’s highway infrastructure and engineering background. Geoff and our team will work closely with MDT to gather relevant data on infrastructure conditions, capacity, traffic volumes (commercial and private), port service. In addition, we will leverage our work on border crossing studies nationally to inform an assessment of border security policies and programs and the implications to Montana. For example, we are currently leading a study of the US-Mexico border crossing (California to Texas) for the US Department of Commerce and have worked with the Department of Homeland Security on the US-Visit program and thus are very familiar with recent policies, issues, and US Customs and Border Protection (CBP) data and processes. We have divided this task into the following sub-tasks:

Task 2.1 Traffic Conditions

Traffic conditions will be assessed for the north-south highways identified by MDT in the RFP, as well as US Highway 2 and all ports from Sweet Grass to Raymond. Key data elements will include:

- Highway infrastructure and capacity;
- Level of service in peak and off-peak periods;
- Volume to capacity ratios;
- Traffic distribution by vehicle type;
- Border crossing wait times;
- Accident rates; and
- Travel patterns (identification of major origins and destinations, percentage of local vs. through trips, seasonal distribution of traffic, etc.)

It is anticipated that much of the data used in this assessment will be provided by MDT and its partners. Additional data sources might include: departments of transportation from neighboring states, Transport Canada, the Federal Highway Administration's Highway Performance Monitoring System (HPMS), US CBP data, and US Bureau of Transportation Statistics freight border crossing data.¹

Task 2.2 Infrastructure Conditions

HDR will assess current infrastructure conditions of the relevant highways and ports of entry in terms of geometry, lanes and lane width, shoulders, grade, and other operational characteristics. This assessment will also include an assessment of pavement quality and deterioration, along with any issues related to the movement of commercial traffic (such as narrow lanes that are undesirable for truck traffic). Based on the literature review and consultation with MDT and its partners, we will identify any planned improvements to highways or ports that would add capacity or facilitate operations.

Task 2.3 Port Service, Border Security Policies and Programs

In this sub-task, HDR will compile relevant information on US-Canada ports in terms of service, security and safety, and other policies. In addition to consultation with MDT and regional partners, we will leverage our contacts at CBP and Homeland Security to gather the most timely and relevant policy and programmatic information regarding US-Canada ports of entry to ensure that our findings and future projections take into account possible restrictions, impediments or efforts to use ITS to facilitate commercial traffic at border crossings.

Task 2 Deliverables

- Technical Memorandum #2: Existing Conditions of Highways and Ports

¹ HDR recently acquired data from CBP through a Freedom of Information Act request and now has access to detailed border crossing times by month, by hour from 2004-2007. For example, the average border crossing time in October 2007 at Sweetgrass was highest at 10am (17.9 minutes).

3.2.3. Task 3 – Existing and Future Economic Conditions and Trends

Under this task, the research team will review existing documentation, conduct interviews and collect regional economic data to provide a detailed assessment of existing regional economic conditions and discuss opportunities for structural changes in the regional economy. For this project the region of interest may include origins and destinations for major commercial movements.

Figure 1: Market Target - Canadian Provinces

HDR will collect and analyze recent freight flow data from the Bureau of Transportation Statistics, which the trade by port of entry, origin, destination, volume, and commodity. The study will, therefore, include an assessment of existing and future demand and supply of these commodities and their impact on the level of trade and the use of Montana ports of entries. In other words, the study will include a thorough assessment of the Canadian market, especially the area of Alberta and Saskatchewan, shown on the above map as well as the trading markets within the United States, such as the Colorado, California, and the Texas markets. The analysis will also test whether the recent economic development is sustainable and therefore require significant improvement to the port of entries and the impacted corridors.

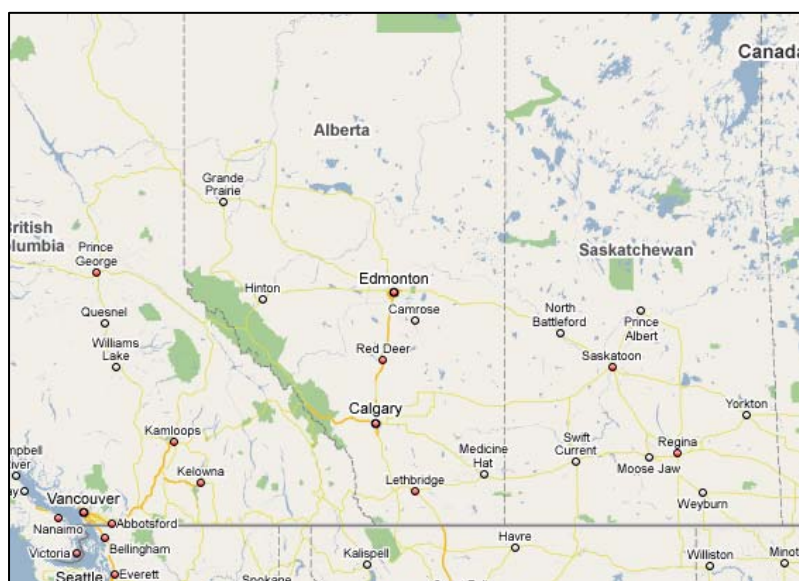
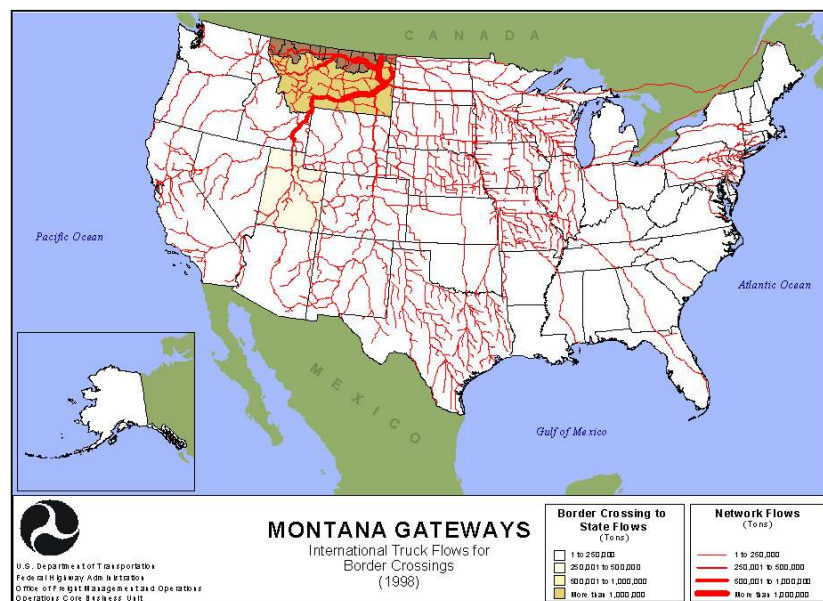


Figure 2: Market Target – United States

Task 3 will include a number of discussions with economic development leaders, leading regional economists, industry associations, commercial shippers, other regional stakeholders. These discussions will serve as part of the primary research to gain insight into industry, trade and economic trends, as well uncover existing and relevant economic data and forecasts.



Task 3 will comprise a total of four (4) major sub-tasks: 3.1 Initial data collection and information review; 3.2 Assessment of existing economic conditions; 3.3 Primary research; and 3.4 Assessment of future economic growth and opportunities.

Task 3.1 Initial Data Collection and Information Review

During the project kick-off meeting, the principal in charge and project manager will meet with MDT to review and discuss the main objectives of the study, and review available data sources and relevant reports. The research team will obtain and review all existing data and documentations related to the project. Publicly available data sources to be explored include the Ministries in both Alberta and Saskatchewan such as Ministry of Energy, Ministry of Sustainable Resource Development, Ministry of Infrastructure, and Ministry of Transportation; Montana Department of Commerce, the Bureau of Business and Economic Research at the University of Montana, the US Census Bureau, The US Bureau of Transportation Statistics, the US Bureau of Economic Analysis, the US Bureau of Labor Statistics, StatsCanada, and other local/regional economic development, planning and transportation agencies.

The HDR team will obtain for review, in particular, regional, state and local socioeconomic trends and projections, regional economic studies and industry profiles from both the Canadian side and the US side. These reviews will allow HDR to assess the demand and supply side for both raw products and finished products from both sides of the border and how the State of Montana bridges both sides.

HDR will coordinate with MDT's Transportation Planning to have access to all available historical traffic and freight volumes, existing traffic pattern surveys, most current cross-border survey information, maps and aerial photographs, and any other pertinent documents. A complete listing of the data sources and documents identified under this task will be provided to MDT. As part of this effort, the research team will also develop an approach for primary data collection (through site visits, and/or interviews) as described in Task 3.3. The type of information to be collected, as well as its future use in the study, will be clearly identified and communicated through MDT.

Task 3.2 Assessment of Existing Economic Conditions: Data Analysis and Reporting

A central component to this research project is a thorough assessment of recent and existing economic conditions and trends in Canada (most prominently Alberta and Saskatchewan). The assessment will be structured in an organized, logical structure as presented below.

Task 3.2.1 Overview of the Regional Economy

The assessment will start with a precise definition of the "region" or study area. While the infrastructure under consideration has been carefully laid out in the RFP, the study area for assessing regional economic conditions is a bit more subjective. HDR will work in close collaboration with MDT staff to come to an agreement on the boundaries of the economic area of influence. It should be noted, that the relevant geography could vary by industry sector. For

example, growth in retail trade opportunities may be more local in functionality and trip distribution than energy and agriculture shipments.

The regional overview will provide a range of demographic, economic, and trade indicators, such as total population, employment, leading industrial sectors, and volume of trade (tonnage and value) moving north and south between Canada and the US through Montana. The overview will include both current economic conditions as well as recent historical trends (e.g., past 10-20 years). In addition, this task will comment on the region's economic integration, in particular in light of U.S. – Canada trade. Population and employment trends will be provided for the region as a whole, and for various geographic areas within the region (e.g., Alberta, Saskatchewan, Great plains, Midwest States).

Socio-economic characteristics may include median household income, educational attainment, distribution by age and race/ethnicity, average household size, unemployment, percentage of households living below poverty, number of business establishments, etc.

In addition to the traffic volume by POE collected in Task 2, trade data will be gathered from WISERTrade database which provides import and export volumes by value by POE. It also includes information by commodity which will assist in the industry sector analysis.

Task 3.2.2 Regional Economic Activity by Sector

This task will present a more detailed industry sector analysis with emphasis on the industries mentioned in the RFP that directly impact commercial traffic volumes. The data collection from Task 3.1 will be used to gather and present existing and recent employment, output and wages/labor income (employee compensation and proprietor's income). Industries to focus on include:

- Energy;
- Agriculture;
- Mining and Oil Extraction;
- Manufacturing;
- Tourism; and
- Wholesale and Retail Trade.

The industry analysis will include location quotients to measure the “concentration” of industry activity, the size of the industry (employment and output), as well as recent growth trends. This analysis will include all major industry sectors thus allowing for a comprehensive assessment of industry trends. For example, there could be some industries (e.g., construction) with high growth trends that require cross-border shipments of goods. HDR economist Fred Kramer based in Calgary will be essential for this task as he is intimately familiar with industry economic data at the province and sub-province level in Canada having recently compiled industry and occupation employment forecasts in Calgary.

To the extent possible, this task will also provide an assessment of how “typical” business establishments operate within these sectors:

- Where the production actually takes place;
- Where the product is being shipped, consumed (for final goods) or processed (for raw material and intermediate goods); and
- What type of infrastructure and resources are being used in the production, storage, shipment and trans-shipment of the products.

This description will be based primarily upon data collected through interviews (Task 3.3). But existing studies will be investigated as well.

Task 3.2.3 Freight Movement and Trade

In this task, the research team will connect the economic and industry assessments described above with existing freight and trade data to assess in detail the economic linkages to Montana port activity and northern Montana highways. This linkage based on recent historical data is essential to complete Task 4 of estimating future commercial traffic volumes. Data used in the assessment of existing freight movements will be derived from sources such as the U.S. Federal Highway Administration Freight Analysis Framework (FAF), the U.S. Bureau of Transportation Statistics on cross-border freight volumes, the U.S. Customs and Border Protection, and the WISERTrade database. To the extent possible, this data will be organized by: a) origin-destination (at least at the provincial/state level); b) commodity; and c) Montana POE. HDR also plans to use a trade database, to be released by the US Bureau of Transportation Statistics by the end of August, which will provide more recent detailed trade volumes by point of entry.

Task 3.3 Primary Research

Upon completion of Task 3.1 and approval by MDT, the research team will complement the data collected with primary data through interviews of key agencies, industries, and other stakeholders. HDR will prepare and get approval from MDT on the questionnaire to guide the interviews and a list of potential interviewees.

Task 3.3.1 Approach

The research team proposes to conduct a combination of in-person and phone interviews with key government planning agencies, regional stakeholders, and industry/economy experts. These interviews are intended to provide detailed information and context necessary to understand current trends and provide input to forecasts of economic activity and the resulting commercial traffic flows. The types of organizations and individuals to interview include:

- Industry experts – mix of industry associations for the relevant sectors covered in Task 3.2 as well as private sector businesses in those industries.
- Regional and state economic development leaders who tend to understand and track industry activity, expansions, and re-locations. We will need to cover economic development

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

organizations in both Canada (Saskatchewan Economic Development Association, Alberta Economic Development Authority, etc.) and Montana (e.g., Montana Department of Commerce, Governor's Office of Economic Opportunity, Bear Paw Development Corporation, and members of the Montana Economic Developers Association) and

- Academic experts on the national and regional economies, especially Alberta, Saskatchewan, and the states trading with these two provinces.
- Chambers of commerce and major developers in the region (e.g., Alberta and Saskatchewan Chambers of Commerce, Malta Chamber of Commerce in Montana).

Special emphasis will be given to those stakeholders most likely to inform the research team on the existing structure and operational organization of the region's economy, and on the likelihood of future structural economic changes and economic growth.

The list of individuals and organizations to interview will be decided in close collaboration with MDT staff.

Task 3.3.2 Interview Plan

Upon selection of the appropriate agencies to interview, the team will prepare an interview plan to establish:

- An optimal number of individuals/experts (number of interviews to complete);
- An appropriate breakdown of the expertise by region; and
- An interview schedule for in-person and phone interviews.

Task 3.3.3 Questionnaire Development

The questionnaire will be developed in close collaboration with MDT staff to assure that the primary research will develop the most productive and practical information to inform economic trends, forecasts and commercial traffic volume estimates.

The questionnaire will include questions on:

- Current operations (e.g., inbound and outbound shipments by mode) and trading patterns;
- Current and future (planned) utilization of northern Montana ports and highways;
- Economic expansion plans and growth projections;
- Current impediments to business expansion or re-organization (including transportation capacity, institutional/regulatory impediments, energy prices, workforce or other impediments);
- Relevant data and forecasts by industry or local/regional economy; and

- Canada-US economic linkages and trading partners.

Questions relative to the use of alternative transportation modes (rail, or intermodal highway-rail) and alternative corridors will be included in the interview questionnaire as needed.

A list of the contacts will be maintained for the research files as well as potential participation in a workshop to assess and refine economic and commercial traffic volume projections.

Task 3.3.4 Conducting Primary Research Interviews

The primary research interviews will be conducted by HDR staff out of local offices in Billings and Calgary as well as by our proposed national economics practice. We will propose a mix of in-person and phone interviews to be confirmed by MDT.

Primary research collection progress reports (in addition to the standard project progress reports) will be forwarded to MDT staff for review and comments. The progress reports will include information on the number of interviews completed to date, as well as a brief summary of findings (such as highlighting the stakeholders' comments).

Task 3.4 Assessment of Future Economic Growth and Opportunities: Data Analysis and Reporting

The assessment and compilation of future economic growth and opportunities will comprise two sub-tasks, described briefly below.

Economic opportunities can include:

- Existing (official) development plans by local and regional agencies, large business establishments, and industry leaders;
- Potential macroeconomic changes (such as increases in the price of crude oil, exchange rate realignments, or fluctuations in the price of wheat) that would affect the study area; and
- Structural changes in the region's economy such as new and emerging growth sectors.

The assessment of future economic opportunities will start with a presentation of "official" population, employment and industry growth forecasts (as available) for the study area and individual regional components (i.e., Alberta, Saskatchewan, Montana, Colorado, Texas and other key trade partners of the Canadian provinces). The principal strengths and weaknesses of the regional economy for future growth will also be discussed.

GIS maps will be used to illustrate locations where the growth is expected to be concentrated, thus helping to assess the Montana ports and highways likely be most affected by growth trends.

Task 3.4.1 Review of Economic Opportunities by Sector

The review of economic opportunities by sector will incorporate the opportunities described above with the information collected from primary research and economic data trends. The discussion will be organized around the following economic sectors:

- Energy;
- Agriculture;
- Mining and Oil Extraction;
- Manufacturing;
- Tourism;
- Wholesale and Retail Trade; and
- Others.

In addition, the research team will seek to evaluate the relationship between industry growth (employment and output) to trade and commercial traffic volumes (e.g., volume of trade, and where goods are being shipped, consumed and/or processed). The product of this work will include “baseline” economic and industry growth data for 10-year and 20-year planning horizons for relevant Canadian and US markets, along with a qualitative discussion of risks to the forecasts and trade connectivity between Canadian markets and the relevant northern Montana ports and highways. The

Task 3.4.2 Contingencies

Under this task, the team will assess the range of factors that will influence the economic and industry growth forecasts. These contingencies will be evaluated primarily from the interviews conducted, where interviewees will be asked to identify under which conditions (if any) economic and industry growth is most likely to occur or be impeded. In other words, the research team will try to identify the factors that would influence existing development plans and other economic opportunities to achieve the baseline economic forecast.

For example, key factors could include:

- Industry-specific developments or transformations such as development of refining and distribution facilities;
- Price of oil;
- Potential for modal shifts given higher gasoline prices and relatively lower fuel costs per ton mile for rail;

- Economic development initiatives such as marketing/promotion, tax incentives, workforce training or other programs; and
- Macroeconomic outlook for US and Canadian economies, and global trade.

The outcomes of this task will be provided in a working paper: “Assessment of Future Economic Growth and Opportunities.”

Task 3 Deliverables

The deliverables to be produced under Task 3 include:

- Technical Memorandum#3: Data Needs and Sources;
- Technical Memorandum #4: Interview Results; and
- Technical Memorandum #5: Future Economic Growth and Opportunities.

3.2.4. Task 4 – Future Commercial Traffic Volumes

The primary purpose of Task 4 will be to estimate future commercial traffic volumes on northern Montana highways and ports for 10 and 20 year planning horizons. To achieve that objective, HDR will:

- Build upon the economic and industry conditions and projections from Task 3;
- Structure the commercial traffic volumes based on the highway and port facilities assessed in Task (capacity, operations, etc.);
- Conduct a risk analysis process (RAP) workshop with regional stakeholders and economic/industry experts (identified in Task 3.3) to refine economic and commercial traffic estimates within a risk analysis range (low, median, high); and
- Develop complete technical reports (draft and final) as well as materials for the project summary report and a final report presentation to MDT and its research partners.

Task 4.1 Traffic Forecasting Model Development

Consistent with the RFP, the HDR research team proposes to develop 10-year and 20-year commercial traffic volume projections for the study area Montana ports and highways. As we believe that all forecasts are subject to uncertainty and risk factors, we will construct the commercial traffic volume forecasts within a risk analysis modeling framework. HDR is a leading economic consulting firm at applying risk analysis and further detail on the conceptual approach and process to risk analysis that we apply across projects is described in Appendix C.

Traffic projections to be used in the baseline and alternate scenario will be developed on the basis of:

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

- Current traffic volumes at ports and highways as well as general MDT traffic growth forecasts (e.g., from HPMS);
- Findings from the primary research (Task 3.3);
- Incorporation of regional economic opportunities and growth trends from Task 3.4;
- Commodity flow data (e.g., FHWA FAF data) and border crossing wait times and delays;
- National and international trade projections including predicted future costs of crude oil;
- Expected structural economic changes, such as shifts in the demand for, or supply of specific commodities, changes in production costs, technical and productivity changes, etc.; and
- Expected institutional/regulatory environment and changes (e.g., 24-hour operating schedules).

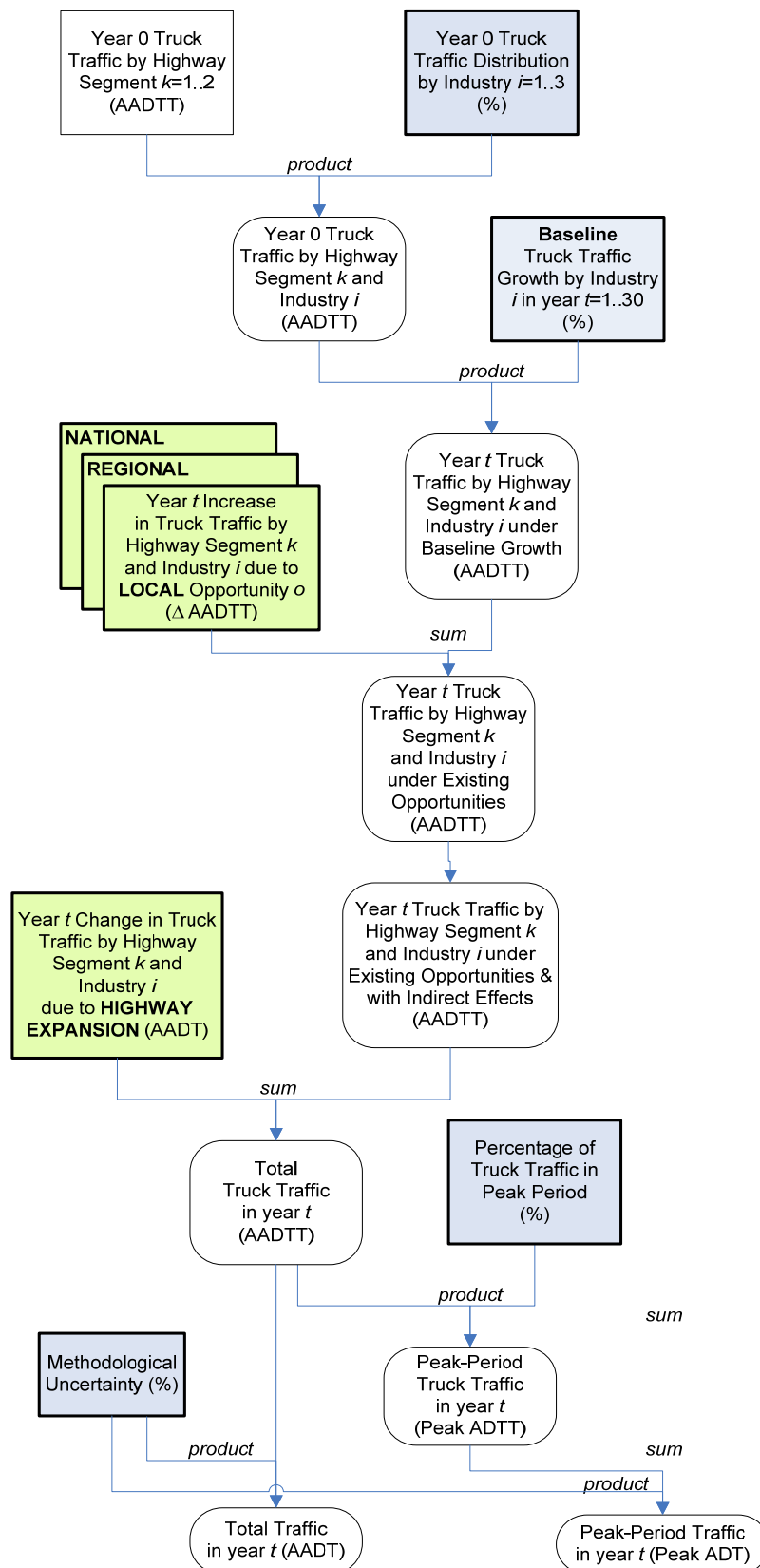
To the extent possible, risk analysis techniques² will be used to estimate:

- The volume of commercial traffic at each port and highways within a low, median and high probability distribution; and
- The volume of freight diverted from “other” modes (e.g., diversion from rail to trucks) or other corridors.

A commercial traffic volume forecasting model will be developed under this task. The model will relate the amount of traffic to industry and geographic regions, as well as planned infrastructure improvements, and broader trade trends. HDR will create structure and logic models for the key aspects of commercial traffic to be estimated. The purpose of the structure and logic model is to clearly demonstrate the linkages between key input variables, risk factors, and ultimate outcomes (commercial traffic volumes by facility). As an example of a structure and logic model, HDR developed a freight forecasting diversion model for US-2 based on regional and national growth as well as different highway improvement levels. Figure 3 highlights the logic used to assess future freight volumes for US-2 within a risk analysis model and was validated and refined through stakeholder workshops.

² With risk analysis, all assumptions and model parameters are allowed to vary within a range or probability distribution. The model output can then be expressed as probability distributions, reflecting the uncertainty associated with each individual assumption and parameter value. A detailed description of the risk analysis framework is provided as an appendix.

Figure 3. Structure and Logic Model for Freight Forecasts



The risk analysis model will be populated with data and information collected in Task 3 and validated during a risk analysis session, described under Task 4.4, below.

HDR will help develop the analytical relationships between:

- The outcomes of the economic, industry and trade projections, and commercial traffic activity (e.g., trade values may be in tonnage or value and need to be converted to trucks; and
- Commercial traffic volumes (trucks and autos, as appropriate) at northern Montana ports and highways.

The assumed trip generation rates, travel demand elasticity coefficients (with respect to travel times or generalized travel costs), and other model parameters developed by the team will be clearly documented and included in the model review from the stakeholder workshop.

Task 4.2 Stakeholder Workshop

A stakeholder Risk Analysis Process workshop (RAP session) will be held in Helena. The session will be facilitated by HDR senior staff, and organized as a structured workshop where panelists (experts and stakeholders) will be invited to review and discuss the structure of the conceptual framework (model), the uncertainty associated with each variable and parameter within this framework, and the initial study findings.

Review and comments will be solicited for the development and implementation of the commercial traffic forecasting models, for the selection of model input values, and for the interpretation of the results by use of an expert/stakeholder workshop as described below.

The research team will prepare and distribute (a few days before the session) a reference book and work book. The reference book will provide background information on the model structure and data elements. The work book will comprise a set of data sheets and entry forms where panelists can provide their inputs and suggestions during the session. The content will be focused on regional economic and industry growth projections, risk factors, and relationships between economic and trade activity to port and highway capacity as well as traffic volumes.

As mentioned above, participants for this workshop will be determined based on the primary research interviews conducted in Task 3.3. HDR will work closely with MDT to select a location and date for this workshop as well as the invited attendees to ensure that we can obtain review and modeling adjustments based on multiple perspectives (Canadian provinces and Montana, different industries, academics, etc.). We view this workshop as an essential component of the research to confirm the commercial traffic forecasting methodology, assumptions, and ultimately the results. We have successfully conducted RAP workshops throughout the country including northeastern Montana and are confident that this work step will ensure: a high-level of accuracy, a reasonable range for 10 and 20-year forecasts taking into account risk factors, and importantly stakeholder buy-in to the research results.

Task 4.3 Sensitivity Analysis and Risk Analysis

Some of the sensitivity analysis tests and scenarios will include changes in:

- Truck Size and Weight Regulation within Montana;
- Truck Hours of Operation for trucks entering the US at Montana POEs;
- Rail-Related Operations including the consolidation of grain shipments into shuttle facilities;
- Crude Oil Exploration Costs;
- Industry-specific initiatives and growth factors; and
- Other potentially significant changes identified in Task 3.4.

The outcomes of the risk analysis will help to determine the traffic conditions and LOS forecasts for each key facility. Risk analysis will allow the research team to assess the probability of different traffic levels on northern Montana ports and highways and thus will provide the input needed to determine whether or not to pursue the Phase II study to examine highway impacts of future traffic and thus potential improvements.

Task 4.4 Final Reports and Presentations

Under this task, the HDR team will:

- Prepare a draft final and final report for internal use only;
- Prepare a draft final and final report for public use (for distribution to the general public);
- Prepare draft final and final project summary content for the project summary report.

A draft final report summarizing the methodology, assumptions, findings, and conclusions resulting from Tasks 1 to 4 will be produced and distributed among the team, MDT staff, and a peer review panel (to be assembled by MDT). After receipt of MDT's comments on the draft final report, HDR will complete the final report for MDT. HDR's principal and project manager have direct experience producing final reports for MDT and will leverage that experience to successfully produce final report documents for this research study. For example, Khalid Bekka was the lead author of the US 2/TRED study for MDT Planning, while Dan Hodge was a lead author of the Highway Reconfiguration Study for MDT's Research Office and thus is familiar with the report formatting requirements of MDT.

Task 4 Deliverables

- Technical Memorandum #6: Methodological Framework;
- Technical Memorandum #7: Reference Book and Work Book for the stakeholder workshop ;
- Draft and Final Report.

SUMMARY OF DELIVERABLES

Tasks	Deliverables
Task 0 – Project Administration	
Task 0.1	<ul style="list-style-type: none">– Project Guide– Project Filing System– Updates to the Project Guide as needed
Task 0.2	<ul style="list-style-type: none">– Meeting notes and action item list following each scheduled meeting;– Monthly progress report to MDT Project Manager– Periodically updated CPM Schedules– Final Executive Briefing with MDT Representatives– Internal meeting notes and action item lists following each meeting, and technical documentation in support of milestones, conclusions, or recommendations
Task 0.3	<ul style="list-style-type: none">– Monthly progress reports– Monthly invoices
Task 0.4	<ul style="list-style-type: none">– Updated Project Schedule files
Task 1 – Literature Review	
Task 1	<ul style="list-style-type: none">– Technical Memorandum #1: Literature Review
Task 2 – Existing Conditions of Highways and Ports	
Task 2.1	<ul style="list-style-type: none">– Technical Memorandum #2: Existing Conditions of Highways and Ports
Task 2.2	
Task 2.3	
Task 3 – Existing and Future Economic Conditions and Trends	
Task 3.1	<ul style="list-style-type: none">– Technical Memorandum#3: Data Needs and Analysis
Task 3.2	
Task 3.3	<ul style="list-style-type: none">– Technical Memorandum #4: Interview Results
Task 3.4	<ul style="list-style-type: none">– Technical Memorandum #5: Future Economic Growth and Opportunities
Task 4 – Future Commercial Traffic Volumes	
Task 4.1	<ul style="list-style-type: none">– Technical Memorandum #6: Methodological Framework
Task 4.2	<ul style="list-style-type: none">– Technical Memorandum #7: Reference Book and Work Book
Task 4.3	<ul style="list-style-type: none">– Draft and final report.
Task 4.4	

3.3. Meetings and Deliverables

As described at the outset of the scope of work, we have designated a project administration task that covers all elements within 3.3 of the RFP. HDR understands and will comply with all elements as described from 3.3.1 to 3.3.11. We provide additional detail on these elements below in the Project Administration task.

3.3.1. Project Kick-Off Meeting

HDR understands and will comply.

3.3.2. Interim Meetings

HDR understands and will comply.

3.3.3. Final Meeting

HDR understands and will comply.

3.3.4. Progress Reports

HDR understands and will comply.

3.3.5. Interim Reports

HDR understands and will comply.

3.3.6. Final Report

HDR understands and will comply.

3.3.7. Project Summary Report

HDR understands and will comply.

3.3.8. All products are considered draft until reviewed and accepted by the State

HDR understands and will comply.

3.3.9. Meetings and products are a direct cost to the project budget

HDR understands and will comply.

3.3.10. Project Level Reporting Guidelines

HDR understands and will comply.

3.3.11. AASHTO submission

HDR understands and will comply.

4. OFFEROR QUALIFICATIONS

4.0. State's Right to Investigate and Reject

HDR understands and will comply.

4.1. Offeror Qualifications/Informational Requirement

HDR understands and will comply.

4.1.1. References

Please see Section 4.1.2 for project write-ups of the studies referenced below for each client reference.

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Senior Transportation Planner
San Diego Association of Governments
Economic Impacts of Wait Times at the San Diego–Baja California Border
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4.1.2. Resumes/Company Profile and Experience

COMPANY PROFILE:

HDR|Decision Economics offers consulting services to industry and governments in the United States, Canada, and throughout the world. HDR|Decision Economics enjoys an international reputation for technical excellence and quality service, particularly in the market areas of risk analysis, transportation and infrastructure, information technology, environment and natural resources, and health care and disability. Our staff includes economists, econometricians, financial analysts, transportation planners and modellers, engineers and statisticians. Our professionals bring to each assignment an innovative and practical approach coupled with state-of-the art analytical techniques. Each engagement is considered a joint undertaking between client and consultant. Typically, HDR|Decision Economics consultants possess one or more post-graduate degrees.

Our reputation for excellence and quality speaks for itself as more than 80 percent of our engagements are with clients who have previously contracted for our services.

HDR|Decision Economics offers unique analytical consulting services in Applied Economics, Financial and Business Case Analysis, Public-Private Partnerships, Third Party Risk Analysis, Cost-Benefit Analysis, Economic Impact Analysis, Policy Research, Market Analysis and Survey Research, Consensus Building and Bid and Proposal Support Services.

SAMPLE FINAL REPORT:

A sample final report, “Economic Impacts of Wait Times at the San Diego–Baja California Border,” prepared for the San Diego Association of Governments is provided as an additional document.

EXPERIENCE:

US 2/MT 16 Transportation Regional Economic Development (TRED) Study

HDR|Decision Economics was contracted by the Montana Department of Transportation to identify what economic, regulatory, or operational changes would result in traffic and safety conditions that would warrant expanding the Theodore Roosevelt Expressway in Montana to a four-lane highway. This roadway consisted of sections of MT 16 and US 2 that collectively run from the Canadian border through Montana to the North Dakota border.

To facilitate our analysis process for the US 2 / MT 16 TRED study, HDR|Decision Economics conducted site visits to northeastern Montana and Saskatchewan and involved experts and local stakeholders to determine and quantify risk factors that might potentially affect this project. HDR|Decision Economics also conducted 120 telephone interviews with regional stakeholders, industry experts, and knowledgeable academic experts to develop a detailed level of knowledge concerning the specific economic and transportation challenges within the region.

As part of the analysis HDR|Decision Economics assessed the existing regional economic conditions and development opportunities within the region and used econometric techniques to create forecasts of traffic growth and freight volumes within a risk analysis framework. These traffic growth forecasts were conducted under an existing development plan scenario and also by accounting for specific regional economic opportunities.

La Entrada Al Pacifico (LEAP) Highway Corridor, Texas Department of Transportation

HDR|Decision Economics developed a freight diversion model to estimate the potential freight trade that would use an improved highway corridor in Texas and Mexico. Trade diversion modeling includes volume and capacity calculations at seaports along the West Coast and Texas-Mexico border crossings, as well as trade forecasts with Asia. Tasks include defining existing conditions, establishing purpose and need, creating a public involvement program, identifying environmental constraints, determining economic impacts, developing alternatives, assessing risk, forecasting existing and future traffic demands, and producing a benefits/cost analysis. In addition, an investigation of financing options would be performed to provide a plan that will identify priorities and provide a phased approach to corridor development.

The objective of the project was to prepare a feasibility study of roadway improvements to determine whether a four-lane divided roadway or other roadway improvements are appropriate to meet current and future demands along the existing corridor. The La Entrada al Pacifico Corridor is anticipated to run from Midland/Odessa, Texas to Presidio on the Texas-Mexico border.

HDR|Decision Economics applied a thorough risk analysis-based approach to estimating freight diversion potential that incorporates current and projected freight flow data, volume to capacity ratios at key gateway facilities, and detailed stakeholder input to develop a range of likely freight growth.

Economic Impacts of Border Wait Times at the San-Diego – Baja California Border, San Diego Association of Governments (SANDAG)

HDR|Decision Economics is under contract with the San Diego Association of Governments (SANDAG) to conduct an economic impact study of border wait times at the San Diego – Baja

California border region. Economic impacts are estimated on two broad categories of traffic: (i) cross-border personal trips for work, shopping, recreation and vacation purposes, and (ii) cross-border freight movements. The assessment is performed on both sides of the border, at the local, regional and national levels over the next ten years. Direct, indirect and induced impacts on output, labor income and employment are estimated using multipliers from input-output models such as IMPLAN Professional 2.0. The study also relies on the results of a four-month survey of border crossers at three land ports of entry (POE): Otay Mesa-Mesa de Otay, San Ysidro-Puerta Mexico, and Tecate-Tecate. Through HDR|Decision Economics' findings, this project intends to strengthen collaboration among SANDAG, Caltrans, and federal inspection agencies in the United States and Mexico to help secure the border, manage wait times, and enhance the binational economy.

National Corridor Planning and Development and Coordinated Border Infrastructure For FHWA, HDR assessed two highway projects under this engagement focused on economic development in highway corridors. The projects, selected by local stakeholders for detailed analysis were (1) a reconfiguration of an existing freeway interchange in the City of El Centro and (2) a bypass being constructed around the City of Brawley. These projects were analyzed with respect to their potential economic benefit to the region. The study found that four factors were key to the identification of projects with true development potential:

1. Local engagement in the short-listing of candidate projects for analysis; the design of candidate projects; the forecasting of candidate project outcomes; and the realization of project benefits;
2. Integrated project design;
3. An *accessible* and *incremental* forecasting framework; and
4. A detailed and reasoned framework of risk analysis and on-going risk management.

The study found that projects with the stipulated aim of promoting economic development must be defined and designed differently and more broadly than is the practice in traditional highway planning. Project definition and design must integrate traditional highway engineering factors (routing, geometrics, etc.) with urban, regional and economic planning factors, such as zoning and other land-use considerations, tax policies and so on. In general, neither the engineering, nor the planning and policy dimensions of projects whose purpose is economic development can be regarded as sufficient in themselves to prompt development outcomes.

North East Can Am Connections: Integrating the Economy and Transportation

The Maine Department of Transportation, with the participation and collaboration of five Eastern Canadian Provinces and four Northeastern US States, is leading a study to examine the adequacy of East-West transportation connections across a bi-national region. The study will provide a comprehensive assessment of the relationship between East-West transportation infrastructure, trade, and economic conditions and opportunities within the region. HDR, as part of a consultant team, was selected to conduct the study.

The study area has six major North-South Interstate highways (I-81, I-87, I-89, I-91, I-93, and I-95) but no equivalent East-West highways between I-90 and the Trans-Canada Highway. Air service for many parts of the study area is costly and time-consuming. Rail links in many areas are limited and some are in decline. The region's ports and the St. Lawrence Seaway are

underused. These and other transportation concerns are considered to be major contributing factors to the sluggish economy in many parts of the study area.

The study is intended to (a) help create a regional vision of long-range transportation improvements appropriate to support regional economic development, and (b) identify specific project elements to be implemented in the near future.

HDR's roles on this project include:

- Evaluation of Regional Competitiveness, including benchmarking of competitive performance in key industries, development of performance comparators and competitor regions, evaluation of relative capital, labor, and input productivities, development of Gap assessments and development of institutional issues and solutions.
- Risk Analysis Process (RAP), HDR managed the stakeholder input process through a RAP approach to assess key issues to address, prioritize strategies, and evaluate the economic development and industry-specific benefits of various policy and investment strategies.
- Economic Impact Analysis, HDR developed an economic impact analysis modeling framework to evaluate trade flow, cost savings, and induced economic development gains via a risk analysis structure to account for uncertainty in future impacts, trends, and investment policy. HDR also helped determine future trade volumes at seaports, border crossings and related user benefits
- Cost Benefit Analysis (CBA), utilizing transportation needs and economic impact evaluation information developed by the project team, HDR was responsible for the creation of a CBA framework to assess alternative investment strategies.

Regional and National Economic Impact of Increasing Delay and Delay Related Costs at the Windsor-Detroit Crossings For a bi-national, multi-jurisdictional client (Transport Canada, FHWA, Michigan DOT, and Ministry of Transportation Ontario) HDR provided economic analysis in support of the Canada-US-Ontario-Michigan Border Transportation Partnership's Feasibility Study to develop a long-term transportation strategy that will ensure the safe and efficient movement of people, goods and services across the United States and Canadian border within the region of Southeast Michigan and Southwest Ontario. Specifically, HDR conducted several tasks, including:

- An economic assessment of the impact of increasing traffic congestion in the Windsor-Detroit crossings on the industrial productivity, economic activity in the area and tourism in the region at the local, regional, and national level. This task developed a framework that linked the traffic congestion at the border and its effects on the logistical and transportation costs by industry to the trade and tourism level between the two countries at their busiest crossings.
- A benefit cost analysis of the build alternatives for resolving the congestion issue. These alternatives included bridge and tunnel crossings at different locations within the Detroit-Windsor regions. The analysis accounted for travel timesavings, vehicle operating savings, safety savings, environmental savings, impact on residential neighbourhoods, and impact on existing businesses and future development.

- The study also included an estimation of potential diversion to rail and water modes using intermodal elasticities of demand for freight shipment and freight movement trends by commodity type in a risk analysis framework.

Labour Market Demand Study For Calgary Economic Development (CED), HDR was retained to provide a 10 year forecast of labour demand by occupation and industry in the Calgary (Census Division 6). This Labour Market Demand Study identified key drivers of demand for each industry, modeled demand based on these drivers and developed a user-friendly scenario analysis tool provided to CED analysts for internal use.

Starting from an in-depth analysis of the available data, certain model specifications were tested utilizing a set of known drivers. In this manner, key explanatory variables were identified and used in each industry's final model specification. Initial forecasts of labour demand within each industry were then produced and vetted with outside experts including City and Provincial senior economists. Through this consultative process, labour demand forecasts were fine-tuned and consensus with respect to growth in explanatory variables was reached.

Labour demand modeling then turned to the development of a robust scenario analysis tool used for ongoing monitoring of labour demand by occupation and industry. HDR provided CED with such a tool in Microsoft Excel.

Finally, through a series of press conferences and web publications, HDR participated in the promotion and dissemination of results to various stakeholders including the general public and, most importantly, industry groups.

Global Labour Supply Study for the Calgary Economic Development (CED)

HDR was retained to determine forty (40) key occupations to target for international recruitment to Calgary and to develop CED's workforce recruitment strategy with informed, sound and rigorous analysis of global talent supply from 100 countries globally. The identification of key occupations to recruit is based on the Calgary Labour Market Demand Study that HDR conducted for CED as well as on CED key economic sectors and strategic target occupations.

HDR analyses will enable CED to be strategic in regards to not only the occupations that it dedicates its resources towards recruiting, but also the locations whereby CED may undertake costly and expensive in-market recruiting and visitation. Given the high costs of such activities, CED wishes to inform and substantiate its activities to ensure the highest chances of success and the greatest return on its investment. Additionally, the information regarding talent supply modeling can be disseminated to Calgary employers in order to support their planning for overseas recruiting efforts.

The modeling efforts for this project build on the RDA Global Economics Database which contains an extensive collection of occupation and industry data for all countries in the world. Included in this effort is the development of country specific immigration indices which are based on the RDA Global database of political and economic indicators and analyses of occupational survey data from over 50 countries.

Comprehensive U.S. – Mexico Border Study, U.S. Department of Commerce

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

For the U.S. Department of Commerce HDR assessed the economic impacts of delays experienced by commercial trucks at the U.S.-Mexico border. The assessment was performed at the state and national levels on the U.S. side of the border, based on wait time data collected from the field for the top five land ports of entry: Otay Mesa, CA; Nogales, AZ; El Paso, TX; Laredo, TX; and Hidalgo, TX.

Data on truck volumes were extracted from the Bureau of Transportation Statistics' TransBorder Freight Database. Sensitivity to border delays was measured with survey data and compared to secondary data from the literature for validation purposes. The economic multipliers, used to estimate the indirect and induced impacts of border wait times on the U.S. economy, were obtained from the IMPLAN economic impact modeling system.

It was found that the United States loses about \$1.87 billion in net annual revenue from freight activity Because of delays experienced by trucks at the border. This translates into about 4,900 jobs lost (or a \$0.32 billion labor income loss). When accounting for the indirect and induced effects of the net revenue loss, the total impact amounts to a \$5.79 billion loss in business output and 26 thousand jobs lost. The annual economic impact of wait times will more than double by 2017 if delays grow as projected and if infrastructure and operations remained the same.

In addition, HDR measured the beneficial impact that various solutions to border delays proposed by Accenture would have on trade and, by extension, on the national economy. The analysis resulted in the recommendation of a set of solutions at each POE that would yield maximum results and return on investment.

Cost-Benefit Analysis of Highway Improvements in Relation to Freight Transportation, Federal Highway Administration, Office of Freight Management and Operations

Over a three-year period of sustained research and development, HDR|Decision Economics has:

- Developed groundbreaking theoretical extensions to micro-economic theory as a foundation for identifying the benefits of highway investment in the freight sector;
- Provided a comprehensive and definitive analysis of the nature of highway-generated economic benefits in the freight sector, including the effects of highway performance on firm-level logistics, industrial organization, productivity and competitiveness; Obtained third-party validation of theoretical extensions and freight effects through an Eno Foundation peer review process;
- Developed econometric estimates of all coefficients and elasticities required in order to enumerate the framework outlined above in relation to specific corridor investment alternatives;
- Developed a fully functional Cost-Benefit Analysis computer model that facilitates field application of the methods outlined above. The model incorporates the econometric findings and gives the freight economic effects and benefits as well as all other conventionally measured benefits;
- Reported the quantitative significance of freight-related benefits from a national economic perspective, presenting compelling evidence that such benefits have been sharply understated in the past.
- Three major reports have been published by FHWA, segments have been used in Freight Office brochures and websites, and the computer model has been circulated to regional offices.

RESUMES:

Daniel J. Hodge
Project Manager

Professional Experience

Daniel J. Hodge, Senior Economist with HDR Decision Economics in Boston, has 14 years experience in regional economic modeling, benefit/cost analysis, economic development analysis, and public finance. Mr. Hodge has managed or been the lead economist on numerous transportation economics studies. He has led economic analyses of highway studies in Montana, New York, Ohio, Georgia, Indiana, Colorado, Texas, and Missouri; transit studies in Utah, New York City, and California; seaport impact studies in Los Angeles and Florida; and freight rail studies in Massachusetts, Vermont, New York, and the Mid-Atlantic region.

Education

Master of Arts, Public Policy, University of Michigan, 1999
Master of Arts, Applied Economics, University of Michigan, 1999
Bachelor of Arts, Economics/Finance, Lafayette College, 1994

Professional Affiliations

Transportation Research Board, Transportation and Economic Development Committee, Member, 2006-2008

Industry Tenure

14 Years

Montana Highway Economic Analysis Tool, Montana Department of Transportation (MDOT). Project Manager. For the integration, training, and enhancements related to the Highway Economic Analysis Tool (HEAT). Mr. Hodge worked directly with MDT staff on the use of the model and validating scenarios to measure the economic benefits and costs of highway improvements. Previously, Mr. Hodge was the Deputy Project Manager of the Highway Reconfiguration Study aimed at examining the economic development impacts of highway investments in Montana. He served as the technical coordinator developing a cohesive and integrated model (HEAT) that can analyze any highway investment in the State, through the use of a GIS-based platform, linking highway network, commodity flow, and economic impact models.

Northeast Can-Am Connections Trade and Transportation Study, Maine DOT. Economist. As part of a study to examine transportation strategies to facilitate trade and economic development in a four state, five province region, Mr. Hodge led the economic and benefit/cost analysis of policy and investment strategies. HDR led a focus group meeting of industry representatives and constructed logic models and economic factors to assess future economic growth and trade scenarios due to strategic recommendations.

Arizona Commodity Flow Analysis, Arizona Department of Commerce. Project Manager. Mr. Hodge served as Project Manager for a study on commodity trade flows, which evaluated trade flows by all modes for inbound, outbound, through and internal trips. This study also

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

included a preliminary assessment of opportunities to expand the transportation and logistics industry sector within the State.

La Entrada al Pacifico Highway Corridor, Texas DOT. Economist. Managed the development of a freight diversion model to estimate the potential freight trade that would use an improved highway corridor in Texas and Mexico. Trade diversion modeling included volume and capacity calculations at major seaports along the West Coast (U.S. and Mexico) and Texas-Mexico border crossings, as well as trade forecasts with Asia and economic growth in Mexico.

Economic Impacts of the Appalachian Development Highway System (ADHS), Appalachian Regional Commission. Project Manager. Study estimated the full range of economic benefits and costs of completing the remaining 15 percent of the ADHS. The study developed a multi-state travel network model along with comprehensive economic benefit tools that capture commodity flows and trade patterns, user benefits and reliability, accessibility to markets, business attraction, and benefit/cost analysis.

U.S. DOT Freight Economic Impact Study, U.S. Department of Transportation. Deputy Project Manager. Study to develop an economic impact analysis framework to estimate the regional and national economic benefits of large-scale freight projects that are proposed for Federal funding consideration. Mr. Hodge was the lead author of the resulting guidebook on economic analysis that considers geographic perspectives (local, state, national), and the distribution of public/private benefits across all modes of freight transportation investment.

North Country Transportation Study, Development Authority of North Country (DANC), NY. Lead Economic Analyst. Study that focused on the development potential of an economically lagging and isolated region on the St. Lawrence Seaway. Mr. Hodge evaluated local economic and demographic conditions through an extensive interviewing, survey, and data collection process. He also analyzed and conducted economic impact and benefit/cost analysis of potential transportation investment strategies to promote economic development.

Economic Competitiveness of Southeast Florida, Economic Development Research Institute. Project Manager. For two parallel studies assessing the performance of the Southeast Florida economy and developing recommendations to improve the economic prosperity of the region. One study focused on the seven-county Southeast Florida region and the other detailed the challenges and opportunities for Palm Beach County. The economic analysis evaluated industry trends, the workforce and education of the region, and the infrastructure required to support a growing economy.

Florida DOT Macroeconomics Analysis, Florida Department of Transportation. Project Manager. Examined the macroeconomic effects of program-level transportation investments by mode (highway, rail, air, transit, seaport) at the statewide and district levels. The study developed methods to link transportation investments, user benefit models, and a macroeconomic simulation model to estimate economic impacts. Mr. Hodge subsequently updated this study for the Florida DOT in 2006, and continued to conduct various economic analyses, including the development of economic competitiveness criteria for the Future Corridors Initiative.

Georgia High-Priority Corridor 6 Analysis, Georgia Department of Transportation (GDOT). Lead Economist. For GDOT, Mr. Hodge was the Lead Economist examining improvements to an east-west corridor from Savannah to Alabama. He developed a procedure to forecast commodity movements using economic forecasts and detailed historical commodity flow data.

Georgia Statewide Transportation Plan (SWTP), Georgia Department of Transportation (GDOT). Economist. For the Georgia Department of Transportation Statewide Transportation Plan, Mr. Hodge evaluated major economic trends in Georgia, identified linkages between industry clusters and transportation demand, and forecast economic conditions for the State and local areas. In addition, he forecast motor fuel tax revenues and Federal funding sources. He also completed the updated SWTP, developing economic forecasts and an economic impact analysis methodology, including the delivery of a Georgia-specific Highway Economic Analysis Tool (HEAT).

I-69 Evansville to Indianapolis Tier 1 EIS, Indiana Department of Transportation. Economist. Mr. Hodge led the assessment of the economic impacts of a proposed Interstate highway connecting Evansville and Indianapolis. This analysis included local interviews to estimate the potential for business and tourism attraction to the region, as well as sophisticated regional economic simulation modeling using the Major Corridor Investment Benefits Analysis System (MCIBAS). He has also applied MCIBAS to assess the economic benefits and costs of the state's Long Range Plan.

Kansas Economic Development Strategic Plan, Kansas, Inc. Project Manager. Led an appraisal of the competitiveness of the Kansas economy. This analysis included a statewide examination of economic performance, labor force shortages, capital availability, and the efficacy of economic development organizations. He also contributed to the development of economic policy strategy recommendations for the State.

Ohio DOT Freight Mobility Study, Ohio Department of Transportation. Economic Analysis Lead. For the Ohio DOT, Mr. Hodge led the economic evaluation of improving freight bottlenecks in Columbus and Cincinnati. The analysis used hourly traffic data to carefully measure the impacts to auto and truck traffic of increasing capacity at the major bottlenecks. The analysis estimated local and statewide economic impacts and calculated return on investment (ROI) in terms of project benefits and costs.

Regional Economic Models, Inc. Analyst. At a previous employer, Mr. Hodge served as an analyst, consulting with clients on a wide variety of economic policy studies. He developed regional policy simulations and economic forecasts for governmental clients throughout the United States.

Khalid Bekka, Ph.D.
Principal in Charge

EXPERIENCE SUMMARY

Dr. Bekka is an applied economist with diverse skills in research, program/project management, regulations and international trade. His experience and excellent credentials provide outstanding support in many areas. He has exceptional quantitative skills and has put them to use on projects involving cost-benefit analyses, utilization studies, economic model building, operations management, and financial analyses. He possesses expertise in both public and private sectors and has a thorough understanding of competitive price analyses, operations, logistics and computer applications. Dr. Bekka has managed dozens of economic analysis, transportation and planning projects for federal, state, and local agencies. Dr. Bekka published and presented several articles in the transportation field in the U.S. and Europe.

PROFESSIONAL QUALIFICATIONS

Ph.D., Economics, University of Delaware (1997)
M.A., Economics, University of Delaware (1994)
M.B.A., Operations Management, Widener University, PA (1992)
B.S., International Business Management, Goldey-Beacom College, DE (1989)

SELECTED PROJECTS

NorthEast Montana US-2 Economic Development Benefits Study, Montana Department of Transportation (MDT). Principal in Charge. Led a major regional economic development study aimed at assessing whether the Montana portion of the Theodore Roosevelt Expressway corridor (a designated high-priority trade corridor between Canada and the Dakotas) should be expanded from two to four lanes. The study included a survey of local stakeholders and repeated outreach efforts in the impacted communities.

Lewistown Bypass Feasibility Analysis, Montana Department of Transportation. Project Manager. Assessed the feasibility of constructing a bypass northeast of the Town of Lewistown, Montana that would connect US 87 and US 191. The analysis contained two components: traffic assessments and economic surveys. The economic feasibility analysis used the transportation modeling and risk analysis program, StratBENCOST, to analyze the projects benefits and costs.

Detroit-Windsor Crossing Feasibility Study, Canada - United States, Ontario - Michigan Transportation Partnership. Project Manager. Provided technical assistance on a number of economic issues, including the economic assessment of various road-based investment alternatives.

Development of Highway Investments Cost Benefit Analysis Tool, Transport Canada. Developed an economic framework to assess the economic worthiness of highway projects. The project consisted of gathering inputs from all the transportation agencies from various provinces and the assessment of available economic evaluation models for highway projects. The framework was set to be developed into a computer model to be distributed to the provinces for their project evaluation process.

Economic Development and Highway Investment, Federal Highway Administration. Principal in Charge. Led a corridor study in Imperial County, CA, which investigated the

relationship between highway investment and economic development. The study led to the development of a methodology to estimate the potential economic development attributable to highway investment using traffic and socioeconomic data as well as risk analysis and local experts panel involvement.

Benefits of Highway-Freight Improvement, Federal Highway Administration (FHWA), Office of Freight Management. Project Manager. Developed a framework to measure the long-term benefits of highway-freight improvements and examine the dynamic interactions between transportation demand, transportation costs, and the condition and performance of the Nations highway system. The analysis assesses these interactions beyond the traditional travel time savings within the conventional benefit cost analysis framework.

Cost Benefit Analysis of Project Acceleration Alternatives, Minnesota Department of Transportation (MNDOT). Principal in Charge. Developed a methodology and risk analysis model to estimate the costs and benefits associated with the acceleration of highway projects, through design/build contracts or other means. The model was demonstrated with data from the ROC52 construction project, located west of Rochester, Minnesota. The study received the Gold Award in the 2006 National Partnership For Highway Quality's Breaking the Mold category.

Development of Highway Investments Cost Benefit Analysis, National Cooperative Highway Research. Task Lead. Developed cost-benefit software to evaluate and assess the benefits and cost for highway construction and improvement using risk analysis. The project included over ten case studies using data from different states department of transportation and transportation agencies. The software StratBencost was evaluated and approved by a panel of economist and transportation experts from the private and public sectors. StratBencost is currently used by several transportation agencies and is continuously updated.

Feasibility Study for SR-704 Construction, Washington State Department of Transportation (WSDOT). Led the development of a Cost-Benefit analysis model for assessing the construction of SR-704 (a six-mile east-west link between I-5 and SR 7 in Pierce County, Washington) and four other build alternatives, including transit service expansion, addition of HOV lanes, and widening of existing roadways.

Financial Feasibility of LA-1, Federal Highway Administration (FHWA), Transportation Infrastructure Finance and Innovation Act (TIFIA) Joint Program Office. Project Manager. Developed risk-adjusted toll revenue projections for the LA-1 Leeville Bridge project, in Louisiana. The analysis assessed the financial feasibility of the major roadway leading to Port Fourchon, LA. The findings were presented to LA Secretary of Transportation and USDOT officials.

HERS Model Update, Federal Highway Administration. Principal in Charge. Provided recommendations regarding updates of the assumptions in Highway Economic Requirements System (HERS) model, in terms of inventory costs, value of time estimates, and reliability metrics.

Highway A2 Financial Feasibility, Agency for Motorway Construction and Operation, Poland. Project Manager. Integrated risk analysis components into a financial model developed

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

by Deutsche Bank AG London to evaluate the financial feasibility of a major toll road project (the A2 motorway).

Highway User Forecast, Arizona Department of Transportation. Principal in Charge. Provided support to Arizona Highway User Revenue Fund (HURF) and the Maricopa County Regional Area Revenue Fund (RARF) in its financial and bonding process. The analysis is conducted within risk analysis to account for uncertainty and ensure transparency.

Highway User Revenue Forecast, Missouri Department of Transportation (MODOT). Principal in Charge. Updated econometric models and computer simulation programs to forecast revenues flowing into the Missouri Highway User Revenue Fund and other statewide revenues fund.

I-71 Corridor Light Rail Cost Benefit Analysis, Ohio-Kentucky-Indiana Regional COG, Southwest Ohio Regional Transit Authority and Transit Authority of Northern Kentucky Ohio, Indiana and Kentucky. Conducted a cost-benefit analysis of light rail alignments. Applied risk analysis to estimate benefits of congestion relief, affordable mobility and economic development. Conducted a travel time survey, urban planning analysis and held meetings with political leaders and communities along the alignments to account for all issues of the proposed investment.

I-75 Feasibility Study, Ohio Kentucky Indiana Regional Council of Governments, Southwest Ohio Regional Transit Authority, and Transit Authority of Northern Kentucky. Conducted a cost-benefit analysis of the I-75 light rail alignments. A panel of academic and business members supervised the project. The analysis applied risk analysis to estimate congestion relief benefits, affordable mobility benefits, and economic development benefits due to light rail. The study included financial planning analysis as part of the FTA New Starts requirement. The analysis demonstrated that the LRT investment can be successfully funded through federal, state, and local sources given the ridership estimates and expected operation performance.

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

Geoffrey T. Parkins, PE

Task Leader

Professional Experience

Mr. Parkins has over 9 years of roadway design experience at all levels of design, from conceptual layout through final design, on both urban and rural roadways. His specific expertise includes alternatives analysis, geometric layout, context-sensitive solutions (CSS), and estimates. He is skilled in the use of automated design and CADD applications such as MicroStation, InRoads, GEOPAK, and AutoCAD. The following projects represent Mr. Parkins' experience.

Education

Bachelor of Science, Civil Engineering, University of Nebraska Omaha, 1998
Associate of Applied Science, CADD (Surveying and CADD), Southeast Community College NE, 1994

Professional Registrations

Professional Engineer, Montana
Professional Engineer, Utah

Professional Affiliations

American Council of Engineering Companies, Montana Chapter, Member, 2007-Present

Montana Department of Transportation, Lakeside Safety Project, Lakeside, MT. HDR is providing public involvement services for this safety improvement project. The project will involve the modification of the intersection where Political Hill Road ties into US 93 south of Lakeside to allow only right-in/right-out movements. A left turn bay is proposed about 1-mile south of Political Hill Road at the intersection of Angel Point Road and US 93. Depending on public support for the proposed modifications, HDR will provide final design and environmental documentation services.

Montana Department of Transportation, Blue Mountain Road Safety Project, Missoula, MT. HDR is providing design for the complete reconstruction of the existing Blue Mountain Road in Missoula, MT, to meet current design criteria and improve safety. Project activities include: public involvement, cultural resource management, initial site assessment, biological resources report, geotechnical evaluation, survey, right-of-way deed preparation, subsurface utility exploration, hydraulics report and design, roadway alignment planning, environmental documentation, retaining wall design, and PS&E preparation.

United States Army Corps of Engineers – Sacramento District, Dugway Proving Ground Environmental Assessment, Tooele County, Utah. Project included preparing an Environmental Assessment for the proposed runway expansion at Michael Army Airfield. Responsibilities included operational and planning traffic analysis of the proposed action and authoring transportation related sections of the environmental document.

Utah Department of Transportation, 800 North, Orem Environmental Studies. HDR prepared the conceptual design plans and environmental documentation for the Environmental Studies for the proposed roadway widening of 800 North (SR-53) from Geneva Road to US 189 in Orem, UT. The project involved reconstructing and widening 4.1 miles of urban arterial, one interchange, and the relocation of a collector road. Engineering responsibilities included

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

conceptual layout alternatives, horizontal and vertical alignments, environmental impacts analysis, computerized templating, and cost estimating. Public involvement activities involved participating in public meetings, meeting with stakeholders and government officials, and acquiring project animations.

Utah Department of Transportation, 1200 West PS&E, Orem, UT. HDR performed final design services and prepared the PS&E bid package for relocating the intersection of SR-52 and 1200 West about 450 feet away from an I-15 interchange to improve safety and operations on SR-52. The project required realigning one half mile of 1200 West and updating the existing traffic signal. Extensive coordination was required to conform to both local city and State standards. Design elements for this project included roadway, signal, lighting, structural, hydraulics, and right-of-way. Additionally, HDR led public involvement activities regarding noise wall installation.

Utah Department of Transportation, Atkinville Interchange Environmental Services. HDR is providing environmental and engineering support services to UDOT during the final design of the Atkinville Interchange project. HDR responsibilities include: preparation of an environmental commitments database and plan sheets, assisting in the designation of mitigation parcels, right-of-way preparation, and consulting with UDOT's design consultant on environmental and engineering issues.

Utah Department of Transportation, Legacy Parkway Design-Build, Centerville, UT, Farmington, UT, North Salt Lake, UT, Salt Lake City, UT, West Bountiful, UT, Woods Cross, UT. HDR wrote the Request for Qualifications and Request for Proposals, assisted in the evaluation and selection of a Design-Builder and is currently performing owner oversight in the design and construction phase for a new 14-mile urban freeway bordered by a multi-use trail and 2,098-acre nature preserve. Responsibilities included developing conceptual, context-sensitive design alternatives, cost estimating, and evaluating design impacts.

Utah Department of Transportation, RP 13 Environmental Assessment. HDR prepared an EIS for proposed roadway construction and an interchange at Reference Post (RP) 13 on I-15 about 13 miles northeast of the Arizona border in Washington City, Washington County, Utah. Responsible for authoring the paleontological section of the EA.

Utah Department of Transportation, Southern Corridor Environmental Impact Statement (EIS). Project includes 22 miles of four-lane rural expressway extending from south of St. George at I-15 to west of Hurricane at SR-9. HDR prepared the EIS and performed preliminary design for this new alignment traversing rolling to mountainous terrain. Responsibilities include conceptual alternatives layout and analysis, horizontal and vertical alignment, computerized templating, cross-section development, earthwork volume computation, cost estimating, and public involvement activities.

Utah Department of Transportation, US 6 from I-15 to I-70 Environmental Impact Statement. HDR is preparing an EIS for the proposed widening of the 127-mile US 6 corridor between Spanish Fork and I-70. Throughout the EIS process, the alternative alignments were extensively refined to avoid wetlands and meet U.S. Army Corps of Engineers (USACE) permitting requirements as well as to avoid Section 4(f) sites. HDR and UDOT worked closely with the U.S. Fish and Wildlife Service (USFWS) and Utah Division of Wildlife Resources (UDWR) to develop various wildlife mitigation measures such as wildlife overpasses and underpasses and enhancement of critical big game habitat near the corridor. HDR first began work on the project with a safety improvement study. Responsibilities included conceptual layout, environmental impacts analysis, horizontal and vertical alignments, CSS implementation,

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

computerized templating, cross-section development, earthwork volume computation, and estimating.

City Of Pocatello Idaho, Cheyenne Overpass Environmental Assessment. HDR prepared an environmental assessment (EA) for the City of Pocatello, Idaho. The EA analyzed the potential environmental consequences of the No-Build (No-Action) Alternative and proposed transportation and safety improvements to Cheyenne Avenue between Bannock Highway and South 5th Avenue, east of Interstate 15. Responsibilities include conceptual alternatives layout and analysis, horizontal and vertical alignments, computerized templating, and cost estimating.

Fred Kramer
Task Lead

EXPERIENCE SUMMARY

Mr. Fred Kramer is a proven business advisor with the ability to see beyond the numbers by taking strategic imperative and risk analysis into account drawing on broad experience in economics, finance, project/program management and marketing. An experienced “hands on” manager with a thorough understanding of business decision support specifically in the creation and interpretation of business opportunity evaluations. Mr. Kramer has more than nine years experience in managing teams; an effective written and verbal communicator with strong analytical aptitude.

PROFESSIONAL QUALIFICATIONS

Masters of Arts, Economics, Simon Fraser University, April, 1990

Bachelor of Arts and Science, University of Lethbridge, April, 1988

SELECTED RECENT PROJECTS

For Burlington Northern Santa Fe (BNSF) and Union Pacific (UP) railways developed a public benefits analysis for the proposed Colton Crossing grade separation project. The study quantified the potential benefits accruing from increased time saving to motorists and inventories, reduced vehicle-operating costs and lower environmental emissions.

For Union Pacific (UP) railway developed a public benefits analysis for proposed improvements to Donner Pass.

For CP Rail, researched and reported on the economic, social and environmental benefits of the construction of a new intermodal facility. This report was used in support of various regulatory applications.

For Bell Canada, led a team of managers that provided support to decision-makers in assessing the impacts of proposed business initiatives on Bell Canada finances. These initiatives include new service introductions, re-price actions on existing services, new equipment purchases, implementation of new operational processes such as E-channels, customer specific offers, and the application of new technologies. These business case evaluations include assessments of incremental cash flow, the identification of key variables that are critical to project success, estimation of the probability of project success in terms of positive cash flow and margin analysis.

For Bell Canada, created and presented the financial analysis for all complex customer deals in Bell West. Chairperson of the Investment Review Committee providing advice to the Bell West executive on investment opportunities.

For Calgary Economic Development, developed user friendly models designed forecast employment demand by industry, occupation and skill level for the Calgary Economic Region. The output of these forecast were used to develop employment recruitment strategies in key sectors.

For MBIA Insurance Corp, created risk adjusted forecasts of payroll tax and vehicular fee revenue for use in the securitization of certain assets within the State of Sonora, Mexico.

For Accenture, developed a risk based model and report in support of Accenture's RFP response to Transportation Security Administration for human resource administration services. The model focused on transition costs related to:

- 1) The potential selection of an alternative service provider in providing core human resource administration both in terms of direct costs (i.e. shadow staffing) and indirect costs related to reduced productivity, and;
- 2) The selection of Accenture in providing recruitment services currently performed by another vendor.

Transition cost estimates were estimated applying a risk analytic framework to reflect uncertainty in the underlying forecasts.

For Indian and Northern Affairs Canada, prepared a study to identify major themes related to past and current Aboriginal economic development programs. Based on these themes, the study then recommended key elements which could frame future federal Aboriginal economic development policy.

For Bell Canada, developed on-line tools which are currently being used in the early stages of project development for the estimation of incremental cash flows and the resulting economic viability of proposed projects. These tools are also used to benchmark initial project ideas in order to eliminate less financially attractive projects prior to resources being allocated to the development of comprehensive business cases.

For Bell Canada, project lead responsible for design and implementation of online professional services software. This system, currently in use throughout Bell Canada and its subsidiaries, provides a central repository for all capital projects. Functionality includes workflow email task notification for project approval, integration with SAP P50 for financial reporting, project management capabilities designed to report status throughout the development cycle, and benefit tracking capabilities designed to report project success post implementation. Successfully decommissioned 4 separate project systems resulting in ongoing cost savings. Extensive experience in program management including management of complex customer deal projects, new product introductions, major IT initiatives and cost reduction opportunities. Implemented operational efficiencies through a stream-lined project approval process which resulted in significantly reduced time to market. This departmental process later served as the foundation for the implementation of a company wide project review process.

For Bell Canada, led a team of managers in the technical support of the company's evidence regarding a cost based subsidy proposal for local access competition which resulted in strong internal support and CRTC approval of the proposal. Directed extensive technical work of external consultants within stringent timelines and budget. Developed extensive databases and programs in support of the estimation of population density/provisioning cost correlation including the mapping of 28,000 Census Enumeration Areas to Bell Canada serving territory. Assessed subsidy implications of various high cost banding proposals on Bell Canada finances.

For Stentor Resources Center Inc, provided marketing support in assessing alternative cost recovery mechanisms due to the CRTC mandated implementation of Local Number Portability (LNP) required in the development of local access competition. Calculated and assessed the implications of these cost recovery mechanisms on Bell Canada finances.

For Bell Canada, provided strategic and technical input to setting of "going-in rates" in the transition from earnings based regulation to price cap regulation. Assisted in the preparation of the company's evidence and final argument submissions to the CRTC. Provided ongoing marketing direction as to pricing strategies associated with regulated "price capped" Bell Canada products.

For BC Telecom, prepared evidence of toll revenue forecasts and competitive impacts to senior management in support of local rate application to the CRTC. Supported BC Telecom witness in CRTC oral proceeding

For Bell Canada, prepared the annual employee and non-employee related expense budgets (in excess of \$300M per year), and strategic capital budgets (in excess of 600M per year) by marketing line of business. Provide recommendations regarding expense reduction opportunities and/or expense realignment to Chief Marketing Officer taking strategic imperative into account.

For Stentor Resources Center Inc, worked with U.S. based Carter Marketing Group to learn and implement an integrated approach to market assessment, planning and strategy. This included revenue modeling, expense planning and tracking for advertising, direct mail, telemarketing and direct sales investments. Prepared and delivered monthly presentations to senior management summarizing various market performance measures including market share gain/loss, gross margin, and customer perception. Provided recommendations on critical strategic and operational priorities. Developed "best practices" forum in which comparisons of winback offers, retention strategies, sales channel results and pricing strategies were evaluated across the Stentor owner companies. Ensured key market successes were quickly communicated which, in many cases, resulted in adoption among other owner companies.

Bruno Penet
Task Leader

EXPERIENCE SUMMARY

Bruno Penet is an applied economist with sound skills in research, data analysis and forecasting, and regression analysis. Through past projects he has developed competence in risk and benefit-cost analysis especially with regard to transportation. Mr. Penet conducted a number of economic impact studies for transit agencies and state departments of transportation throughout the United States. He also has extensive experience in paratransit demand analysis and forecasting. Mr. Penet is highly proficient in statistical packages such as EViews and SAS. He also has substantial experience using input-output models such as IMPLAN.

PROFESSIONAL QUALIFICATIONS

M.A., Economics, University of Delaware (January 1999)

B.S., Economics, Université Lumière Lyon II, France (June 1997)

B.A., Political Studies, Institut d'Études Politiques de Lyon, France (June 1994)

SELECTED PROJECTS

Economic Impacts of Wait Times at the San Diego-Baja California Border, San Diego Association of Governments (SANDAG). Economist. Conducted an economic impact study of border wait times at the San Diego-Baja California border region. Developed a model to assess the impacts of border delays on tourism, shopping, work and productivity on both sides of the cross-border regional economy. The model was primarily based on the results of a survey of border crossers at three land ports of entry (POE): Otay Mesa-Mesa de Otay, San Ysidro-Puerta Mexico, and Tecate-Tecate. Given the uncertainty surrounding key assumptions in the economic impact assessment, the model was developed in a risk analysis framework.

Mexicali Economic Delay Study, Imperial Valley Association of Governments (IVAG). Senior Economist. Estimated the economic impacts of border wait times on two broad categories of traffic: (i) cross-border personal trips for work, shopping, recreation and vacation purposes, and (ii) cross-border freight movements. The assessment was performed on both sides of the Imperial Valley Mexicali border at the local, regional and national levels. Developed a spreadsheet model that can be updated by IVAG to track the implications of various policy and technological changes at the border.

Comparison of Marine User Fees in Canada and the United States, Consulting and Audit Canada (CAC). Economist. Developed taxonomy to help compare marine user fees levied in Canada and the United States. Comparative fees were estimated for a statistically significant and representative number of point-to-point movements along alternative Canada versus U.S. oriented routes. Translated the final report in French.

Development of a Cost Benefit Model for Highway Infrastructure Investments, Transport Canada. Senior Economist. Conducted a comprehensive literature review on cost-benefit analysis software for highway infrastructure investments. Compared software with respect to their features and functionality, and assessed some of their relative strengths and weaknesses.

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

Developed a French version of HighwayDEC, a risk based cost-benefit tool for analyzing highway infrastructure investments in Canada.

HURF, RARF, ROW and Construction Costs, Arizona Department of Transportation (ADOT), Financial Management Services. Project Manager. Developed econometric models in EViews to forecast right-of-way acquisition costs, construction costs associated with major highway investment projects, as well as tax revenues flowing into the Arizona Highway User Revenue Fund (HURF) and the Maricopa County Regional Area Revenue Fund (RARF).

Polish Motorway, Agency for Motorway Construction and Operation, Poland. Junior Economist. Developed a flexible financial model for use by the Agency in assessing new motorway projects. The financial model was based on a study prepared by Deutsche Bank AG London to evaluate the feasibility of a major motorway concession project.

Pre-Feasibility Study, Mirabel Transpark Development Corporation (MTDC). Economist. Conducted a pre-feasibility study of a Global Intermodal Freight Transpark at Montreal - Mirabel International Airport. The objective of the study was to examine the prospective demand for a Transpark facility, and give a realistic and risk-adjusted outlook for potential traffic and revenue to stakeholders in the Global Intermodal Freight Transpark. Based on the study results Aéroports de Montréal and the Province of Québec agreed to finance a larger economic impact study.

Review and Critique State Revenue Forecasting Model, Missouri Department of Transportation (MoDOT). Project Manager. Reviewed forecasting models of state highway user revenues and developed new forecasting equations and revenue projections for the FY 2007 FY 2012 period. The econometric analysis relied on a literature review of fuel demand and highway user revenue forecasting. The forecasting models along with the model assumptions were subject to a rigorous review by an independent panel of experts during a Risk Analysis Process (RAP) workshop. Because of the high uncertainty inherent in forecasting the demand for fuel, the projections were generated within a risk analysis framework.

Risk Analysis of Cost Escalation Factors for Highway Construction Materials, Washington Department of Transportation (WSDOT). Senior Economist. Developed cost escalation factors in a risk analysis framework for a number of construction materials of interest to the Washington Department of Transportation. The study relied on a historical trend analysis and an expert consensus-based risk assessment of potential fluctuations in material prices and their key drivers.

Risk Analysis of LA-1 Toll Road Traffic and Revenue Forecasts, Federal Highway Administration (FHWA), Transportation Infrastructure Finance and Innovation Act (TIFIA). Economist. For the Federal Highway Administration (FHWA), Transportation Infrastructure Finance and Innovation Act (TIFIA) Joint Program Office, developed risk-adjusted toll revenue projections for the LA-1 Levee Bridge project, in Louisiana.

Risk Analysis of Rental Car Revenue Forecast at Miami International Airport, Federal Highway Administration (FHWA), Transportation Infrastructure Finance and Innovation Act (TIFIA). Economist. Developed an econometric model to forecast rental car demand at the

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

Miami International Airport rental car facility. The model results were used to project rental car revenue that would help finance the construction of the new facility.

South Sound Logistics Center (SSLC) Market Analysis, Port of Tacoma and Port of Olympia. Task Manager. Participated in a market analysis of a logistics center in the South Sound region of Washington State. Estimated absorption rates for the fully developed logistics center, potential revenues from property sale or lease, as well as potential tax revenue and impacts on the regional and state economies. The economic and fiscal impacts were estimated within a risk analysis framework using IMPLAN multipliers.

Statewide Gas Tax Revenue Forecast, Ohio Department of Transportation (ODOT), Office of Finance and Forecasting. Project Manager. Projected motor fuel tax revenue in Ohio over the next five fiscal years. The projections were based on an econometric analysis of fuel consumption and its main determinants, and relied on an in-depth literature review on fuel demand and fuel tax revenue forecasting. Because of the high uncertainty inherent in forecasting the demand for fuel, the projections were generated within a risk analysis framework: central forecasts were presented along with lower and upper forecasts. Produced a user-friendly model for ODOTs staff to forecast future state gas tax revenue at various times over the next five years.

The Socioeconomic Benefits of Public Transportation in Selected Pennsylvania Cities, Pennsylvania Department of Transportation (PENNDOT). Senior Economist. Estimated the socioeconomic benefits of public transportation (congestion management, affordable mobility and economic development) in three selected systems in Pennsylvania (SEPTA, LANTA and IndiGO). The benefits of transit were measured for three socioeconomic sectors: employment; healthcare; education; and retail, recreation and tourism.

The Socioeconomic Benefits of Transit in Wisconsin, Wisconsin Department of Transportation (WisDOT). Economist. Conducted a benefit-cost analysis of transit in the State of Wisconsin over the period 2005-2024. Benefits were estimated by socio-economic sector and system size. The analysis showed that investing in transit was economically worthwhile under different state funding scenarios.

John Stout

EXPERIENCE SUMMARY

John Stout is an applied economist with skills that include proficiency in several programmable computer software packages including VBA, GAUSS, and SAS. Mr. Stout also has experience in various data analysis techniques including cross sectional and time series regressions and with advanced econometric techniques including structural VAR's and factor model analysis. Mr. Stout led various risk analysis studies for clients such as the Montana DOT, Washington State DOT, NYC Department of Environmental Protection and US Customs and Border Protection.

PROFESSIONAL QUALIFICATIONS

ABD, Economics, University of Kansas (2005)
M.A., Economics, University of Kansas (1998)
B.S., Economics, University of Kansas (1996)

SELECTED PROJECTS

MDT US-2 TRED Study, Montana Department of Transportation. Economist. Led a study to assess the feasibility of highway expansion in Northeast Montana. The analysis relied on developing freight and traffic volume forecasts within a risk analysis framework. The process consisted of involving experts and local stakeholders to determine and quantify risk factors that may potentially affect this project.

HighwayDEC Development, Transport Canada. Economist/Programmer. Developed a computer software tool (HighwayDEC) useable by each Province and Territory in Canada for the economic evaluation of potential highway construction projects. The software utilized risk analysis and handled both roadway segment and traffic network inputs.

US-98 Florida Corridor Project, Northwest Florida Transportation Corridor Authority via Subcontract with HDR Panama City. Economist. Conducted a toll corridor feasibility study that evaluated the worthiness of several toll corridors as public investments. Analysis included forecasting of future year toll traffic, estimation of project costs within a Cost Risk Analysis (CRA) framework, and modeling future year financial viability based on project costs and toll revenues.

Oregon DOT Eastern Connectors Project, Oregon Department of Transportation. Economist. Conducted analysis assessing eighteen alternatives for combinations of north-south and east-west highway enhancements using HDR's cost-benefit and cost risk analysis methodologies. The analysis incorporated risk analysis both in the construction costs and in the traffic benefits generated for each alternative.

Columbia River Crossing CBA, WSDOT and Oregon DOT (Joint Venture as CRC Organization). Economist. Conducting analysis to assess eight alternatives for bridge replacement and transit implementation alternatives between Vancouver, WA and Portland, OR. This project is utilizing HDR's Transdec tool to develop cost-benefit analysis results.

Construction Employment Creation Model, American Federation of Labor-Congress of Industrial Organizations (AFL-CIO). Economist. Constructed a model to forecast the number of full-time equivalent (FTE) union jobs created for various construction projects by state, type and total development cost. This analysis utilized standard construction industry modeling software and regional economic input-output software.

FTA Six Cities Escalation Rate Update, Federal Transit Administration (FTA). Economist. Identified escalation factors that led to higher construction costs as well as provided projections for these cost within a risk analysis framework for six mass transit projects in Charlotte, Cleveland, Los Angeles, Phoenix, Pittsburgh, and Seattle.

Delaware Aqueduct Rehabilitation (DEL-185), New York City Department of Environmental Protection. Economist. Conducted risk analysis of a major construction and rehabilitation project involving complex tunneling for water supply. The study involved the risk assessment of three build scenarios and consisted of reviewing and applying risk to the base cost estimates as well as quantifying key risk factors affecting the project.

NYCDEP Dependability, New York City Department of Environmental Protection. Economist. Conducted risk analysis of ten major construction projects under consideration to enhance water supply network capacity and redundancy. The analysis involved identifying and applying risks that affect project costs as well as risks that had project schedule impacts.

US Army Alaska Business Case, US Army and Alaska Railroad Corporation. Economist. Updated and enhanced a financial business-case model and report for the analysis of the economic worthiness of a railway extension to be utilized for both US Army and private industry transportation in Alaska.

PPACG HighwayDEC Training, Pikes Peak Area Council of Governments. Project Manager. Led a project to perform benefit-cost analysis within a risk analysis framework for eight highway infrastructure projects within Colorado by utilizing HighwayDEC. These projects included scenarios such as upgrading intersections with interchanges, highway widening projects, and extensions of existing roadways. Also led a training session in the use of HighwayDEC for analysis of highway infrastructure projects as part of this project.

PROFESSIONAL MEMBERSHIPS

National Association of Business Economists (NABE), 2007 -- Present

Patrick Murray

EXPERIENCE SUMMARY

Patrick Murray is an applied economist with skills in research and analysis. Through past projects he has developed competence in research and analytical tasks with particular emphasis on the issues pertinent to the management of renewable and non-renewable resources. He also has skills in econometrics, environmental economics, cost risk analysis, macroeconomics, and microeconomics including game theory.

PROFESSIONAL QUALIFICATIONS

M.S., Resource and Applied Economics, University of Alaska Fairbanks, 2006

B.A., Economics and Management, Gettysburg College, 2004

SELECTED PROJECTS

Alaskan Way Viaduct Cost Risk Assessment, Washington State Department of Transportation. Economist. Assisted in the development of the cost risk model and the production of results presentations and reports.

CEVP, Utah Department of Transportation. Economist. Developed the cost risk assessment models for several Cost Estimation Validation Process projects including some on going projects. Produced results presentations and assisted in compiling the project reports.

Columbia River Crossing Cost Benefit Analysis, Washington State Department of Transportation. Economist. Currently assisting on the cost benefit analysis of several bridge alternatives for the I-5 Columbia River Crossing. Primary responsibilities are compiling the traffic and ridership data needed to use the Transdec model to complete the analysis.

Columbia River Crossing Project Cost Risk Assessment, Washington State Department of Transportation. Economist. Assisted in the update of a previous cost risk analysis to assess revised alternatives for the replacement or repair of the I-5 Columbia River Crossing Bridge. Involvement included the development of the model and assisting in the elicitation of risks in Risk Analysis Process.

Consolidated Rental Car Facility Cost Risk Assessment, Port of Seattle. Economist. Assisted in the cost risk analysis of the Consolidated Rental Car Facility. He developed the cost risk model to assess the building of the new rental car facility, and created the report and presentation of the results.

Eastern Connectors, Oregon Department of Transportation. Economist. Currently assisting the development of a cost risk assessment model.

I-5 / I-205 Salmon Creek Interchange CVEP, Washington State Department of Transportation. Economist. Assisted in the cost risk analysis of the I-5/I-205 Salmon Creek interchange. Primary responsibilities were the development of a cost risk model to assess the risks involved in the project and provide the results in presentation and report formats for WSDOT.

I-5 Columbia River Crossing CVEP, Washington State Department of Transportation. Economist. Assisted in the cost risk analysis of the I-5 Columbia River Crossing Bridge. He developed a four alternative cost risk model to assess the highway and transit alternatives of the river crossing and present the findings.

La Entrada Al Pacifico Frieght Diversion, Texas Department of Transportation. Economist. Developed a Freight Diversion model to estimate the range of likely diversion to a new border crossing in Presidio, Texas. Other responsibilities included data collection, and writing the results report.

SR-520 Cost Risk Assessment, Washington State Department of Transportation. Economist. Assisted in the cost risk analysis of the State Route 520 Bridge. He researched and developed the cost risk model to assess the building of a new bridge across Lake Washington.

SR-704 Cross Base Highway Cost Benefit Analysis, Washington State Department of Transportation. Economist. Worked on the team conducting the Cost Benefit Analysis of State Route 704 the Cross Base Highway. Primary responsibilities were the creation of the StratBENCOST model to measure the costs and benefits of the changing traffic conditions on the local area.

US-98 Florida Corridor Project, Florida DOT. Economist. Developed the cost risk assessment models for four different segments of a potential toll road in Florida. Produced results presentations and provided the results for use in the CBA.

Publications Authored - Journal Articles

“Welfare effects of increased train noise: A comparison of the costs and benefits of train whistle use at highway-railway crossings” (with Brendan Cushing-Daniels). *Transportation Research Part D*, September 2005 p 357-364.

Publications Authored - Conference Papers

“Highway-Rail Grade Crossings: Noise Pollution and Safety,” *The Fourth Annual Student Conference in Business and Economics*, Elizabethtown College, April 2004

EMPLOYMENT HISTORY

Economist, HDR|HLB Decision Economics, Silver Spring, MD, 2006 - Present

Research Assistant, UAF School of Management/School of Fisheries and Oceanic Sciences, 2006

Jonathan S. Lee

PROFESSIONAL EXPERIENCE

Mr. Lee, an economist with HDR Decision Economics in Boston, has five years experience in transportation economics and macro-economics policy analysis. He is supporting economic analysis practices in the areas of transportation, the environment, energy, and economic development, and finance. His primary duties include conducting primary and secondary research to support the formulation of analytical solutions, the development of economic models and the interpretation of results. Mr. Lee collects and reviews existing research and assesses the applicability of results to the problem at hand. He collects, compiles and assesses data relating to research issues, utilizing knowledge of available data sources and various econometric and sampling techniques. His duties require a sound knowledge of economic and econometric methods. Responsibilities include writing and presentation of findings that require an ability to communicate complex analytical concepts. Example modeling techniques include cost-benefit, risk, forecasting, and economic impact analysis. Mr. Lee formulates recommendations, policies, or plans to aid in market interpretation or solution of client issues with clear, specified objectives and limited variables.

EDUCATION

Bachelor of Arts, Economics, University of MA Amherst, 2003

PROJECT EXPERIENCE

HDR Engineering, I-64 Economic and Regional Mobility Study. Mr. Lee will be evaluating and measuring the impacts to the St. Louis economy of the full closure of Interstate 64. He will be tracking the impacts over time: before closure, during, and after. He has been working with the HDR team to develop surveys for local businesses to see the impacts of I-64's closure on their commuters, revenues, real estate market, and sales.

Kiewit Southern Corp., Market Assessment and Identification of Future Opportunities. Mr. Lee's role is analyzing Kiewit's previous project data to determine key drivers of Kiewit's success in Southeast markets. He will then assist in the econometric and risk analysis to determine market drivers and identify future markets.

Rutland Redevelopment Authority, Rutland Rail Switching Yard Relocation, Rutland, VT. This is a \$1.1 million Environmental Impact Study (EIS) and preliminary engineering project. Located in Rutland, Vermont, the project has been undertaken by the Rutland Redevelopment Authority and VTrans in order to alleviate capacity problems experienced at the current railyard site, as well as to create opportunities for increased commercial development in accordance with Smart Growth principles. FHWA is lead agency for the EIS. Mr. Lee is updating the socio-economic data for the EIS.

Analyzed and assembled findings for PHMSA's Program Evaluation. Economist GS-09. Primary focus was on reviewing and critiquing all regulatory analyses post January 2005

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

Assessing the Economic Impacts of SR509 and I-405 Using TranSight. Project Manager. This pilot project focused on evaluating the economic impact of increased access through transportation improvements on parallel highway corridors in Central Puget Sound, WA.

Assisting New Mexico Department of Finance and Administration on Economic Impacts of Legislative Bills for 2004-2005 Legislative Session. Analyst. Was exposed to a variety of legislative proposals including: severance taxes, airport expansion, and health insurance premiums.

Estimated **Avoidable Core Costs for specific Amtrak locations** and operations using regression analysis. Economist GS-09.

Provided **macro-economic impact analysis** in the areas of: taxation, fiscal impacts, transportation, creating firms, construction projects, retail trade, and job sustainability. Associate Economist / Business Development Associate.

The Economic Impact of Arizona House Bill 2139: Corporate Income Tax Apportionment Formula. Analyst. Multiple scenarios were developed to evaluate the economic consequences of moving from a double weight sales factor, to allowing firms the choice between the double weight sales factor and a new formula strictly based upon in-state sales.

The Economic Implications of Installation Growth at Fort Riley. Analyst. Partnered with RKG Associates to produce a strategic plan for Fort Riley, KS in preparation for the Base Realignment and Closure (BRAC) process.

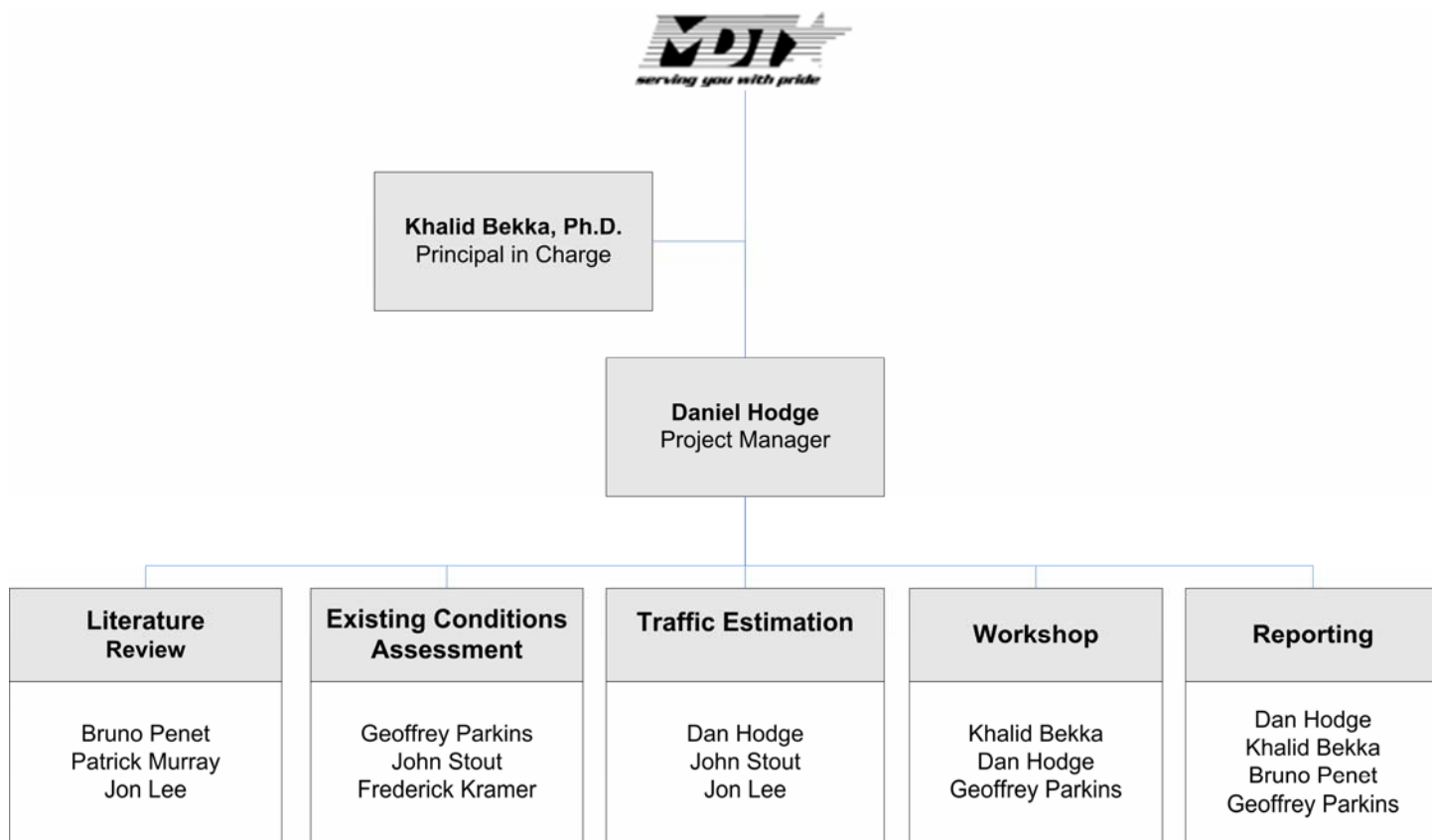
Worked closely with **Federal Land Management Agencies** to evaluate the macro-economic benefits of Federal Lands for the Reauthorization of SAFETEA-LU. Economist GS-09.

4.1.3. Method of Providing Services

HDR's Work Plan is provided in great detail in Section 3 above, including a thorough project administration task to highlight the manner in which we plan to work collaboratively with MDT to successfully complete this research project. In this section, we present:

- An organization chart to highlight the major work areas and responsibilities, including the close working relationship between our Principal in Charge, Project Manager and MDT.
- A detailed project schedule to complete all necessary tasks of this study within an aggressive but practical nine (9) month timeframe.
- Brief biographies of our key staff members, many of which have worked directly for MDT and are familiar with both US and Canadian economic and transportation issues, including the use of our local Billings, Montana office as well as a project economist based in Calgary, Alberta.
- Project commitments of the proposed HDR staff that demonstrate our availability and commitment to work with MDT on this important research study.

Following is an organization chart, an availability chart and a project schedule.



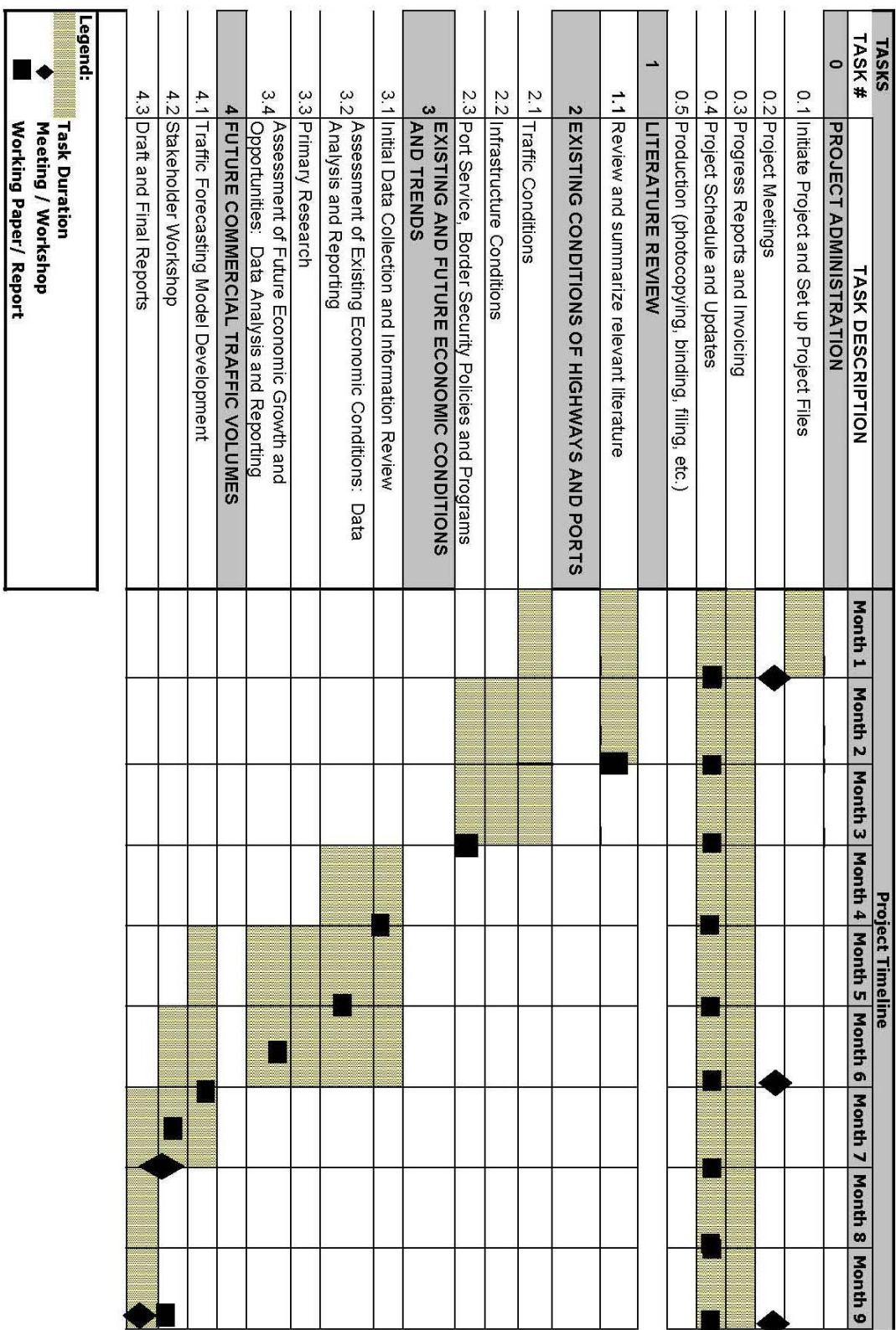
Montana Department of Transportation

Impact of Canadian Economic Development on Northern Montana Highways

The following table presents the commitments of the proposed team as we currently know them throughout the proposed period of performance. There is nothing that should inhibit the team from providing adequate attention to the project and to be able to accommodate adjustments in schedule or workload.

Name, Firm	% Time Committed	Project Commitments
Dan Hodge	60 10 10 10 10	<ul style="list-style-type: none"> Montana Department of Transportation Massachusetts Freight and Rail Plan Kansas City Economic Development Plan Economic Feasibility of Northeast CanAm Connections Florida DOT Macroeconomic Analysis
Khalid Bekka	40 10 10 10 10	<ul style="list-style-type: none"> Montana Department of Transportation Caltrans I-5 Corridor Assessment NYC DEP Risk Assessment Virginia DRPT Rail Planning I-75 Corridor Feasibility Analysis
Geoffrey Parkins	50 50	<ul style="list-style-type: none"> Montana Department of Transportation City of Billings
Fred Kramer	30 20 5 20 10	<ul style="list-style-type: none"> Montana Department of Transportation Cost-risk analysis of electricity generation plant Construction Labour Market Review Council of Aboriginal Peoples, Economic Opportunities for Off-Reserve First Nations Health Canada, Cost Benefit Analysis of Food Fortification
Bruno Penet	40 25 15 15	<ul style="list-style-type: none"> Montana Department of Transportation USDOT Costs of Congestion Virginia DRPT Transit Benefits NHTSA Speed Management Study
John Stout	50 10	<ul style="list-style-type: none"> Montana Department of Transportation Caltrans
Patrick Murray	45 10 10 10	<ul style="list-style-type: none"> Montana Department of Transportation Wisconsin DOT Virginia DRPT Caltrans
Jon Lee	60 10 10	<ul style="list-style-type: none"> Montana Department of Transportation Massachusetts Freight and Rail Plan Economic Feasibility of Northeast CanAm Connections

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways



5. COST PROPOSAL

5.0. Cost Submittal

Submitted in a separate, sealed envelope.

HDR understands and will comply.

5.1. Cost Schedule

HDR understands and will comply.

5.2. Project Budget

HDR understands and will comply.

5.3. Cost Revisions

HDR understands and will comply.

5.4. Federal Acquisition Regulation (FAR) Payment for Services

5.4.1. General

HDR understands and will comply.

5.4.2. Indirect Cost Rate

☐ Contractor chooses that its indirect cost rate will remain fixed to the date stated in Section 2.0 of the contract. In the event of an extension beyond the date stated in Section 2.0 of the contract, the Contractor will provide a new FAR-audited rate as of the original completion date.

☒ Contractor chooses that its indirect cost rate will be audited annually, and Contractor will comply with the procedure stated below.

5.4.3. Annual Audit

HDR understands and will comply.

6. EVALUATION CRITERIA

6.0. Evaluation Criteria

HDR understands and will comply.

APPENDIX A: STANDARD TERMS AND CONDITIONS

HDR understands and will comply.

APPENDIX B: CONTRACT

HDR understands and will comply.

APPENDIX C: THE RISK ANALYSIS PROCESS

Economic forecasts traditionally take the form of a single “expected outcome” supplemented with alternative scenarios. The limitation of a forecast with a single expected outcome is clear – while it may provide the single best statistical estimate, it offers no information about the range of other possible outcomes and their associated probabilities. The problem becomes acute when uncertainty surrounding the forecast’s underlying assumptions is material.

A common approach is to create “high case” and “low case” scenarios to bracket the central estimate. This scenario approach can exacerbate the problem of dealing with risk because it gives no indication of likelihood associated with the alternative outcomes. The commonly reported “high case” may assume that most underlying assumptions deviate in the same direction from their expected value, and likewise for the “low case.” In reality, the likelihood that all underlying factors shift in the same direction simultaneously is just as remote as that of everything turning out as expected.

Another common approach to providing added perspective on reality is “sensitivity analysis.” Key forecast assumptions are varied one at a time in order to assess their relative impact on the expected outcome. A problem here is that the assumptions are often varied by arbitrary amounts. A more serious concern with this approach is that, in the real world, assumptions do not veer from actual outcomes one at a time. It is the impact of simultaneous differences between assumptions and actual outcomes that is needed to provide a realistic perspective on the riskiness of a forecast.

Risk Analysis provides a way around the problems outlined above. It helps avoid the lack of perspective in “high” and “low” cases by measuring the probability or “odds” that an outcome will actually materialize. This is accomplished by attaching ranges (probability distributions) to the forecasts of each input variable. The approach allows all inputs to be varied simultaneously within their distributions, thus avoiding the problems inherent in conventional sensitivity analysis. The approach also recognizes interrelationships between variables and their associated probability distributions.

The Risk Analysis Process involves four steps:

Step 1: Define the structure and logic of the forecasting problem;

Step 2: Assign estimates and ranges (probability distributions) to each variable and forecasting coefficient in the forecasting structure and logic;

Step 3: Engage experts and stakeholders in assessment of model and assumption risks (the “RAP Session”); and

Step 4: Issue forecast risk analysis.

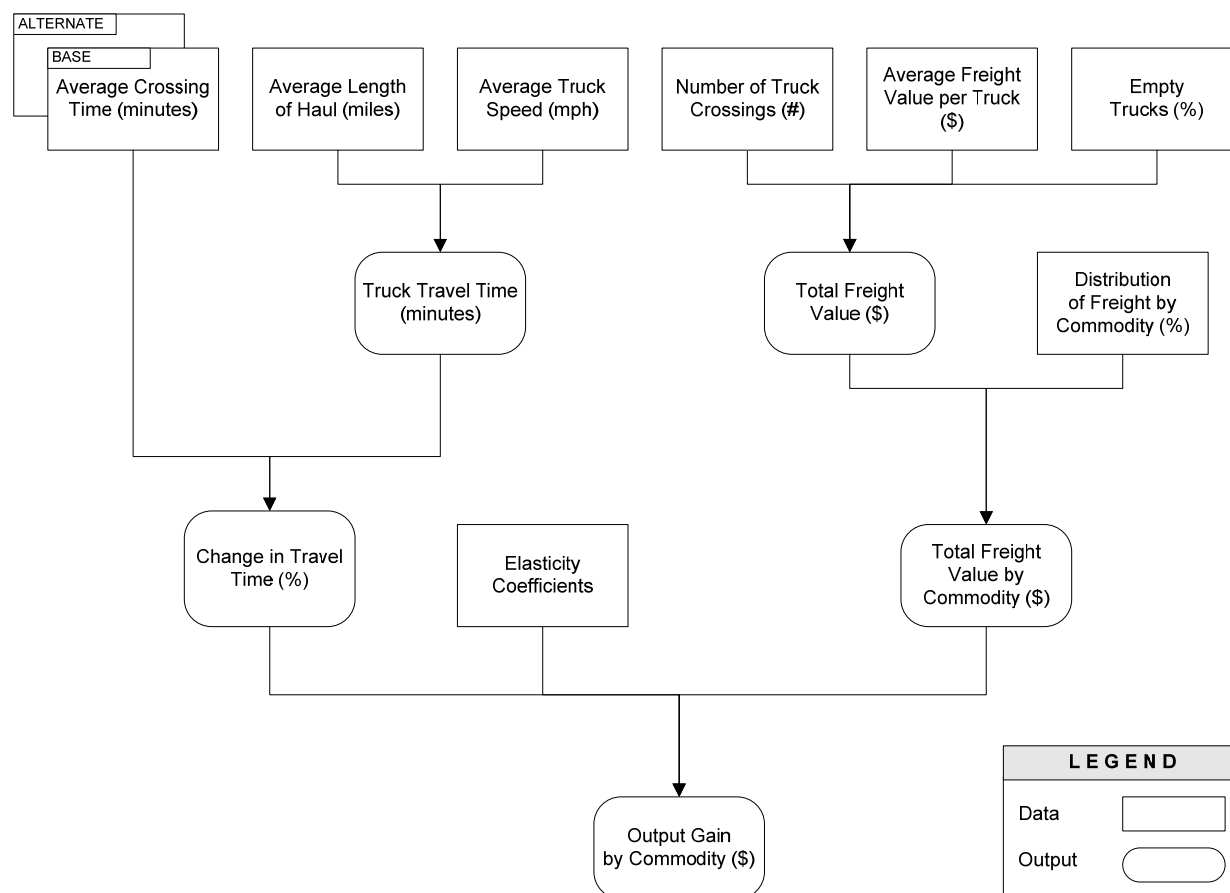
Step 1: Define Structure and Logic of the Forecasting Problem

A “structure and logic model” depicts the variables and cause and effect relationships that underpin the forecasting problem at-hand (Figure A-1).

Although the structure and logic model is written down mathematically to facilitate analysis, it is also depicted diagrammatically in order to permit stakeholder scrutiny and modification in Step 3 of the process (see below).

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

Figure A-1: Example of a Structure and Logic Model



Step 2: Assign Central Estimates and Conduct Probability Analysis

Each variable is assigned a central estimate and a range (a probability distribution) to represent the degree of uncertainty. Special data sheets are used (see Figure A-2) to record the estimates. The first column gives an initial median while the second and third columns define an uncertainty range representing an 80 percent confidence interval. This is the range within which there exists an 80 probability finding the actual outcome. The greater the uncertainty associated with a forecast variable the wider the range.

Figure A-2: Data Sheet for Average Vehicle Speed, an Illustration

	Median	Lower 10% Limit	Upper 10% Limit
Average Vehicle Speed	25 mph	20 mph	30 mph

Montana Department of Transportation

Impact of Canadian Economic Development on Northern Montana Highways

Probability ranges are established on the basis of both statistical analysis and subjective probability. Probability ranges need not be normal or symmetrical – that is, there is no need to assume the bell shaped normal probability curve. The bell curve assumes an equal likelihood of being too low and being too high in forecasting a particular value. It might well be, for example, that if a projected growth rate deviates from expectations, circumstances are such that it is more likely to be higher than the median expected outcome than lower.

The RAP computer program transforms the ranges as depicted above into formal probability distributions (or “probability density functions”). This liberates the non-statistician from the need to appreciate the abstract statistical depiction of probability and thus enables stakeholders to understand and participate in the process whether or not they possess statistical training.

From where do the central estimates and probability ranges for each assumption in the forecasting structure and logic framework come? There are two sources. The first is an historical analysis of statistical uncertainty in all variables and an error analysis of the forecasting “coefficients.” “Coefficients” are numbers that represent the measured impact of one variable (say, income) on another (such as retail sales). While these coefficients can only be known with uncertainty, statistical methods help uncover the magnitude of such error (using diagnostic statistics such as “standard deviation,” “standard error,” “confidence intervals” and so on).

The uncertainty analysis outlined above is known in the textbooks as “frequentist” probability. The second line of uncertainty analysis employed in risk analysis is called “subjective probability” (also called “Bayesian” statistics, for the mathematician Bayes who developed it). Whereas a frequentist probability represents the measured frequency with which different outcomes occur (i.e., the number of heads and tails after thousands of tosses) the Bayesian probability of an event occurring is the degree of belief held by an informed person or group that it will occur. Obtaining subjective probabilities is the subject of Step 3.

Step 3: Conduct Expert Evaluation, the RAP Session

Step 3 involves the formation of an expert panel and the use of facilitation techniques to elicit, from the panel, risk and probability beliefs about:

- (1) The structure of the forecasting framework; and
- (2) Uncertainty associated with each variable and forecasting coefficient within the framework.

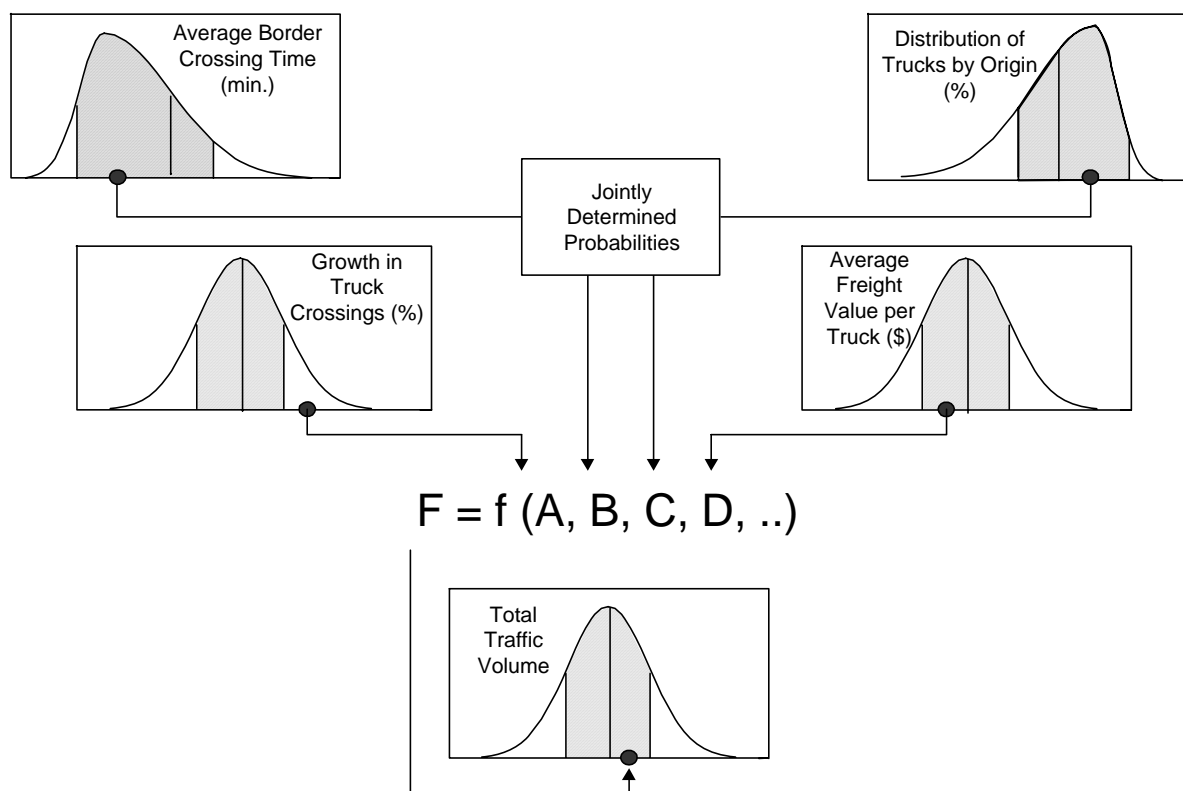
In (1), experts are invited to add variables and hypothesized causal relationships that may be material, yet missing from the model. In (2), panelists are engaged in a discursive protocol during which the frequentist-based central estimates and ranges, provided to panelists in advance of the session, are modified according to subjective expert beliefs. This process is aided with an interactive “groupware” computer tool that permits the visualization of probability ranges under alternative belief systems.

Step 4: Issue Risk Analysis

The final probability distributions are formulated by the risk analyst (HLB) and represent a combination of “frequentist” and subjective probability information drawn from Step 3. These are combined using a simulation technique (Monte Carlo analysis) that allows each variable and forecasting coefficient to vary simultaneously according to its associated probability distribution (see Figure A-3, below).

Montana Department of Transportation
Impact of Canadian Economic Development on Northern Montana Highways

Figure A-3: Combining Probability Distributions



The end result is a central forecast, together with estimates of the probability of achieving alternative outcomes given uncertainties in underlying variables and coefficients (see Figures A-4, A-5 and A-6, below).

Figure A-4: Risk Analysis of Total US2 Traffic, an illustration

Probability of Exceeding	Estimated Traffic Volumes (AADT, thousands)	Percentage of Trucks in Total Traffic (%)
99%	2.15	31.8%
95%	2.31	34.8%
90%	2.36	36.5%
80%	2.41	37.8%
70%	2.45	38.6%
60%	2.48	39.0%
50%	2.52	39.4%
40%	2.55	39.8%
30%	2.58	40.2%
20%	2.63	40.9%
10%	2.69	42.0%
5%	2.74	44.3%
1%	2.97	47.2%
Mean Expected Outcome	2.54	39.8%

Figure A-5: Risk Analysis of US2 Traffic Volumes, *an Illustration*

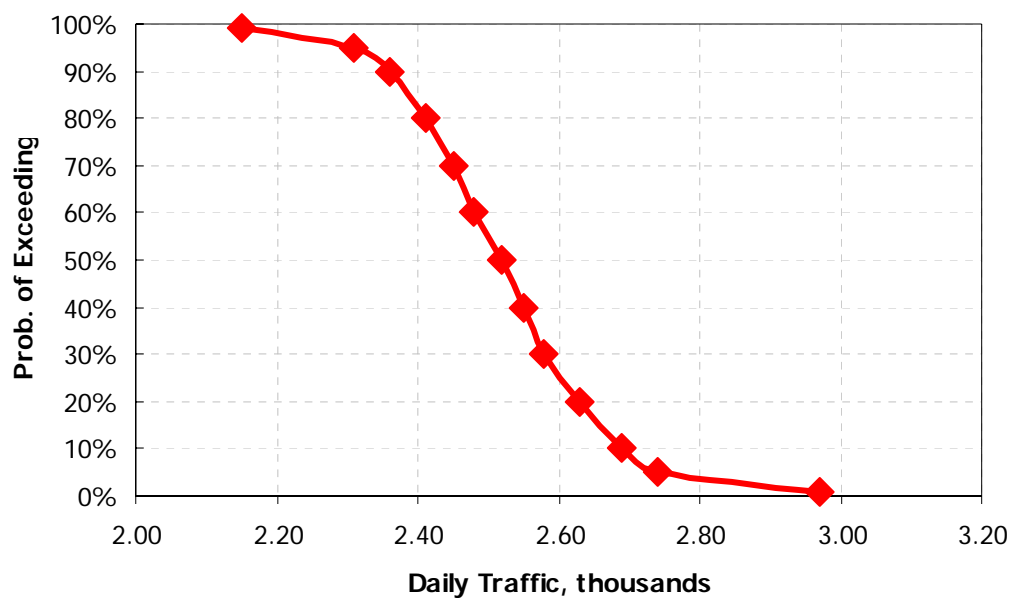


Figure A-6: Risk Analysis of Percentage of Trucks in Total US2 Traffic, *an Illustration*

